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# ***JPRS Report***

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## **Soviet Union**

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***AVIATION & COSMONAUTICS***

No 1, JANUARY 1987

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## SOVIET UNION AVIATION & COSMONAUTICS

No 1, January 1987

[Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.]

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## SOCIALIST COMPETITION IN MILITARY TRANSPORT AVIATION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 87 (signed to press 2 Dec 86) pp 1-3

[Article, published under the heading "Implementing the Decisions of the 27th CPSU Congress," by Lt Gen Avn A. Maslov, first deputy chief, Air Forces Political Directorate: "Restructuring and Competition"]

[Text] Our country has entered a new year -- the year of the 70th anniversary of the Great October Socialist Revolution and the second year of the 12th Five-Year Plan -- filled with productive energy and social optimism. Accepting as their own vital concern and a guide to action a strategy of acceleration and a related program of radical restructuring of economic, social, spiritual/intellectual and other domains of societal activity, Soviet citizens are working hard to implement the decisions of the 27th CPSU Congress.

Air Force personnel are deeply committed to common ideas and aspirations with the workers of industry and agriculture and with the fighting men of the other branches of the Armed Forces. Intensive combat training is in progress in aviation units and subunits. The pace and scope of socialist competition are increasing, under the slogan "We shall implement the decisions of the 27th CPSU Congress, we shall honor the 70th anniversary of the Great October Revolution with selfless military labor!", striving for successful accomplishment of the tasks assigned by the USSR minister of defense and the commander in chief of the Air Forces for the new training year. Initiative and creative innovation on the part of flight personnel, specialist personnel of the aviation engineer service and supporting subunits, and a competitive attitude in training activities and flight operations are directed toward further improving the quality of military labor, flight safety, improvement of political, military, and moral indoctrination, and strengthening of discipline and observance of regulations. The end results of the winter period of training and the training year as a whole will depend in large measure on how fully competition potential is realized.

Our party has devoted and continues to devote constant attention to development of socialist competition. "This is a most important domain of development of creative endeavors by our working people and one of the principal modes of self-affirmation and societal recognition of the

individual," notes the new, revised Party Program adopted by the 27th CPSU Congress. "Grounded on the Leninist principles of glasnost, comparability of results, and capability to repeat advanced know-how, we must improve the organization of and increase the effectiveness of competition, root out excessive attention to form with consequent detriment to content, as well as predictable routine and pattern, and we must develop a spirit of comradely cooperation and mutual assistance."

In the guards aviation regiment in which officer A. Bezrukikh serves, for example, they have an innovative attitude toward organizing competition. In the process of restructuring of organizational, ideological, and political indoctrination work which is taking place in this regiment, they have succeeded in achieving a certain breakthrough in people's consciousness and in the attitude of the majority of commanders, political workers, pilots and aviation specialist personnel toward competition as a matter of great national importance. Principal competition efforts are directed toward priority goals: high-quality mastery of new aircraft, improved tactical competence, and improvement in aviation personnel proficiency rating. It is organized on the basis of Leninist principles, the demands of the CPSU Central Committee, and recommendations articulated by Comrade M. S. Gorbachev, General Secretary of the CPSU Central Committee, at a get-together with veterans of the Stakhanovite movement, production vanguard and innovators.

Favorable conditions for extensive publicity, comparability of results achieved by competing personnel, and practical adoption of advanced know-how have been created in the regiment, and comradely mutual assistance has developed. Individual pledges and competition criteria have become more specific. Competition for the honor of making a training sortie entry in the logbook of Hero of the Soviet Union Capt V. Shibanov, who served with this regiment, has become quite extensive among aircrews. Sr Lts A. Potemkin and V. Balakleyets each earned this honor three times last year. Many military personnel have pledged to make a contribution toward improving the regiment's training facilities. These facilities are currently among the finest in military transport aviation.

Party and Komsomol organizations in this regiment play an active role in increasing the effectiveness of socialist competition. They seek to achieve conscientious, active participation by all Communists and Komsomol members in friendly rivalry and personal responsibility on the part of each and every individual for achieving pledges. The most diversified work forms are utilized toward this end: individual interviews, and presentation of progress reports on pledge fulfillment by Communists and Komsomol members. Personal accountability for failure to meet pledges has been increased.

The regimental Komsomol committee organized competition among Komsomol organizations for the honor of being awarded the unit veterans council prize and hero-regimental colleague pennant. This competition resulted in genuine improvement in combat readiness indicators, mastery of the combat capabilities of complex aircraft, and improvement in personnel proficiency ratings. All aircraft commanders are presently military pilots 1st class, and 80 percent of navigators are advanced proficiency-rating specialist personnel.

There are also a great many other examples of a thoughtful, innovative approach to organization and conduct of socialist competition. Its restructuring is in progress, and initial results are evident in an increased sense of responsibility on the part of commanders, political workers, party and Komsomol organizations of many Air Force units and subunits for achieving adopted pledges and in exemplary performance by Communists and Komsomol members. There has been noted a trend toward overcoming passivity on the part of some military personnel, and more favorable conditions have been created for aviation personnel to display initiative and innovativeness. There is increased personal commitment on the part of officers, warrant officers, noncommissioned officers and primary-rank enlisted personnel for excellent competition end results. Greater attention is now being devoted to publicity and, what is particularly important, adoption of the advanced know-how of the top-performing outfits and specialist personnel.

Analysis of socialist competition results for the past year in a number of units indicated that the influence of competitiveness as an acceleration factor was reflected to a greater degree in improvement in the job proficiency of aviation personnel, thrift and economy, and increasing the activeness of military personnel in volunteer civic work, sports and mass cultural activities. These are merely the first steps in competition restructuring, however. There is still reserve potential to be tapped as well as unresolved problems. For example, even in vanguard units there is frequently a lack of a clear-cut directional thrust to competition focusing first and foremost on high-quality accomplishment of combat training tasks and meeting performance standards, mastery of new equipment, improvement of training facilities and efficiency innovation work, strengthening of process discipline, and improvement in the competence level of military labor. Sometimes the moral and ethical aspects of socialist competition also are less than fully emphasized, which unquestionably diminishes its mobilizing and indoctrinational role.

These and other shortcomings, which are also typical with minor differences both for vanguard and lagging performers, indicate that restructuring of competition is being accomplished in a slow manner. There is still a great deal of excessive attention to form with consequent detriment to content, lack of responsibility, and complacency in the area of organization of competition.

Such a formalistic attitude is frequently manifested in the process of drafting and discussing socialist pledges, the points of which frequently merely duplicate the requirements of military regulations, manuals, official instructions, and the job duties of assigned personnel. Not only is this less than official -- such competition lacks elementary logic. Nevertheless some commanders, political workers, and party activists fail to pay attention to this fact. And if one considers that some military aviation personnel pledges continue to be "carbon-copied" and are easy to accomplish, it becomes obvious why the organizers of and participants in such "competition" practically consider it a burden. Such deficiencies were typical of the military collectives in which officers A. Yashin, V. Danilenko and certain others serve.



Disinclination on the part of some commanders to engage in organization of socialist competition and the inability of others, as well as a lack of rigorous verification, accountability, and practical assistance by political agencies and party organizations lead to a situation where in a number of outfits competition has not yet become an organic part of the training and indoctrination process. Sometimes the increase in the number of excellent-rated individuals and proficiency-rated specialists in the submitted reports obscures the absence of any real increase in combat readiness, personnel expertise, flight safety, and strengthening of discipline. For this reason it is important more rapidly and resolutely to clear the rust of a formalistic attitude from competition, to return inspiration, genuine competitiveness, aggressiveness, and lively innovative enthusiasm to competition, and to ensure that each and every airman can fully develop his abilities and display a high degree of skill, resourcefulness, and keenness of wit.

The Appeal by the CPSU Central Committee to the working people of the Soviet Union, calling for extensive nationwide socialist competition for successfully achieving the targets of the 12th Five-Year Plan, emphasizes that the main competition goals today are increase in labor productivity, improvement in product quality, and economy of resources. In conditions of the restructuring which is taking place in the Air Forces, focusing competition toward excellent end results in accomplishing current tasks is also taking on particular significance as an important factor in accelerating positive changes. We cannot simply wait for the process of technical reequipment of units and subunits and practical adoption of new organizational forms of combat training to begin by itself generating the anticipated increases in combat readiness, personnel proficiency, and flight safety. We can and must right now seek to attain that which is required by guideline documents pertaining to organization of competition, to achieve a qualitatively new level of working and thinking in each and every collective, in each and every sector of military labor. Socialist competition provides excellent capabilities for this, since it makes it possible efficiently and effectively to utilize internal reserve potential for growth, including the human factor.

Indicative in this regard is the experience of the airmen of the regiment in which officer Ye. Zhuykov serves. Rejecting last-minute rush work to meet performance targets and rejecting the mentality of focusing only on success of the moment, this regiment has grounded organization of competition on an orderly, persisting campaign for an excellent result from each and every training activity, each and every flight operations shift, each and every week and month. They have gathered, analyzed and adopted positive experience and know-how bit by bit. In totaling up performance results in the subunits and regiment, they have objectively evaluated achieved results, publicized vanguard performers, thoroughly analyzed the causes of shortcomings and deficiencies, and have named lagging performers by name. The men constantly sensed that attention was being paid to them, were involved in accomplishing the main tasks, and were aware of their achievements, their deficiencies, immediate and long-range goals, and the fact that they would be held strictly accountable for failure to meet pledges. Increased responsibility on the part of competing personnel and the airmen's lively interest in the competition greatly contributed to the fact that last year the regiment carried out the

role of leader with honor and confirmed its title of excellent. We hope that this year as well the airmen will hold their achieved position.

Unfortunately many outfits presently still lack such purposefulness and consistency in building up the efforts of personnel in competition from one performance level to the next. Not everywhere has success yet been achieved in ensuring that the socialist pledges of each airman, flight or section, squadron or company constitutes a precise stage-by-stage program of action, making it possible maximally to concentrate the attention of personnel, energies and resources initially on one or several paramount tasks, shifting to subsequent tasks only after the first have been accomplished.

These well-known items must be discussed, since even today some units and subunits think about pledges only toward the end of a training period, or at best toward the end of the week or month. But if there is not a daily campaign to achieve improved combat and political training results, if there is no analysis of competition progress, where is success going to come from?!

Restructuring of socialist competition presupposes not only improving the methodological expertise of its organizers. The campaign by airmen to achieve excellent end results requires the essential material-technical and cadre support. Some command personnel have not yet become accustomed to considering these most important conditions for competition effectiveness. For example, the practice of transferring or reassigning officers, including leader personnel, in the course of the training year has become quite common. And yet transfer or reassignment is not always warranted or necessary. A change of commanders and leading specialist personnel has an adverse effect on competition results. Such was the case with last year's competition initiator in the Air Forces. A substantial number of officers and warrant officers were reassigned to a new duty post in the course of the year. This diminished the level of direction of socialist competition, its organization, and affected end results.

At the present stage of restructuring of socialist competition it is essential to enhance the role played by headquarters staffs and all aviation services in its organization. It is essential to ensure that they be familiar with actual competition results in the military collective and give practical assistance to personnel in preparing pledges, which would fully take into consideration the specific features of each air component and assigned missions, the men's military occupational specialty, proficiency rating, capabilities for further improvement of job skills, effective utilization of internal reserve potential for improving the quality of combat and political training, and attainment of results from each and every hour of training and flying time.

Priority tasks include precise focusing of competition on priority goals. For aviation units this means first and foremost achievement of a qualitatively new level of air, weapons, and tactical proficiency, flight safety, follow-through and process discipline, as well as skilled mastery of modern combat equipment and weapons. The experience of this past training year attests to the fact that many units and some command personnel have not yet formed a clear idea on how to organize socialist competition in priority

areas, what performance standards to adopt as a basis, what criteria should be adopted for comparative evaluations in totaling up competition results, etc.

The result of this can be shown in the example of the military collectives in which officers V. Tatarchenko and G. Fizbulin serve. All the inspecting officers had to do was complicate the situation and conditions of mission execution, and many airmen produced poor results. Why was this? It was because in the course of competition the participants were focused on some "bare minimum," which would be sufficient to ensure meeting collective pledges. But the actual result was almost as in the saying: "Happy intentions, tearful results."

By utilizing the mobilizing force of competitiveness, one can achieve certain increase in economy, improvement in care, upkeep and safekeeping of aircraft, collect tens of tons of scrap metal, and build athletic facilities with local resources. But competition is not worth a dime if it fails to produce the most important thing -- genuine increase in the basic indicators of combat readiness, military skill, flight safety, and military discipline. It is therefore important to focus and direct the efforts of competing personnel primarily on end results -- achievement of a high level of unit and subunit combat readiness, and high-quality achievement of combat performance standards in their military occupational specialty by all aviation personnel. And pledge achievement results should be determined taking into account marks received in performance evaluation exercises, end-of-training period performance evaluations, check rides and performance evaluations by inspecting officers, performance marks on combat training courses and combat training sorties, and results of personnel participation in competitions and contests in their military occupational specialty.

Practical experience teaches that effectiveness of competition also depends in large measure on seeking new forms and their prompt adoption. The air forces of the Northern Group of Forces, for example, have amassed a fair amount of experience in organizing socialist competition between squadrons and technical maintenance units for reject-free release of aircraft for routine scheduled inspection and maintenance and post-maintenance acceptance. Wherever such competition has been set up in a businesslike manner, it produces tangible results: quality of aircraft servicing improves, and the number of flaws or deficiencies when receiving and turning over aircraft decreases. In the final analysis all this has a positive effect on flight safety.

And yet the experience of the aircraft maintenance personnel of Northern Group of Forces air forces is not spreading rapidly or readily, chiefly because one still finds in the units and subunits those who like the tranquil life. And these people know quite well that any new innovation means additional responsibility, concern and bother. In my opinion those individuals who do not want to restructure themselves should be held strictly to account.

There is one more item which in my opinion is of importance. In organizing competition, some commanders and political agencies devote insufficient attention to the economic aspect of things. Perhaps only at aircraft overhaul enterprises [aircraft maintenance depots] is this problem resolved in a serious manner and on a scientific basis. In line units, however, when they



adopt pledges they rarely give any thought to the financial cost or other material expenditures required by meeting pledges. And in totaling up competition results there is frequently failure to note the cost at which a targeted result was achieved.

All of us need to think and count in order to ensure that there is no savings "on paper alone" in the practical organization of socialist competition. This was noted, for example, in the unit in which officer I. Sautin serves. In this unit POL losses proved to be almost six times the amount saved by socialist competition participants.

Competition results are unquestionably in a direct relationship to active participation by party members. There are many problems in this area. Inspection of a number of military transport aviation units revealed, for example, that approximately 15-20 percent of party members are regularly among the "average performers," while many of them have never been rated excellent. They understand the meaning of restructuring in word but not in deed. There are also many who year after year fail to meet pledges. This does not always, however, arouse genuine concern on the part of some political agencies and party organizations. Frequently they fail to make a frank and firm assessment of the activities of party members and fail to exercise daily oversight over party members. Party committees and buros do a poor job of working with individual CPSU members. As a result they fail to ignite the energy of each and every Communist and to ensure his vanguard role in socialist competition.

There are also examples of party organizations frequently addressing matters pertaining to socialist competition, discussing them at party meetings, and passing appropriate resolutions, but depth of analysis of these matters is not always achieved. Party committees and party buros should place emphasis not on number of measures carried out but rather on their quality and practical results. Right now this is the main thing.

Amassed experience serves as a reliable foundation for organizing socialist competition in Air Force units and subunits in conditions of restructuring. At the same time commanders and political workers -- everybody involved in organizing competition -- must be clearly aware of the fact that since this is a creative and innovative activity, daily search and renewal of content are essential. The new demands of the USSR minister of defense and chief of the Main Political Directorate of the Soviet Army and Navy pertaining to improving organization of socialist competition compel us to work even more persistently to adopt Leninist principles and to follow the instructions of the CPSU Central Committee on enhancing its effectiveness, its mobilizing and indoctrinational role.

Restructuring in competition is a pressing, urgent matter. It is a component part of constructive measures and efforts directed toward intensification of combat and political training and high-quality accomplishment of the tasks assigned to the Air Forces in the new training year.

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## IMPROVING AIR FORCE NAVIGATOR TRAINING IN BOMBER SQUADRON

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 87 (signed to press 2 Dec 86) pp 4-5

[Article, published under the heading "Navigator Training," by Military Navigator 1st Class Maj N. Makeyev: "Long Runs"]

[Text] Bomber elements headed out toward the mock combat area at specified time intervals. Squadron navigation officer Maj V. Vlasov closely monitored the flight configuration and listened closely to radio communications. Calculations on the ground had been made with the aim of bringing the lead aircraft simultaneously to the start of the bombing run from different directions. The situation demanded not only precision navigation but also precise coordination with the fighter escort and strict observance of safety procedures.

When the aircraft reached the specified checkpoint, Major Vlasov radioed: "Reaching intercept point...."

A moment later the copilot announced over the interphone: "Fighters high...."

Bomber element join-up reports began coming over the radio. Things were getting tight in the air, as they say. But every pilot had a precise picture of the subsequent course of events. The pilots knew their routes well and precisely maintained the specified configuration.

Upon approaching the "hostile" air defense radar detection zone, the pilots proceeded to maneuver to evade antiaircraft fire. Specially-tasked aircraft attacked radar sites, enabling the coordinating subunits to accomplish their tactical air exercise missions without hindrance.

The senior-level commander, who was present at the command post, gave high marks to the aircrews' tactical proficiency, professional and weapons skill. It was precisely due to thorough mission preparation and precise execution that the groups of bombers reached the target area with the element of surprise and carried out their assigned missions in minimum time.

A good deal of the credit for this goes to Military Navigator 1st Class Major Vlasov. Working on implementing the commander's plan, this officer pinpointed

all the essential elements of navigation and weapons delivery, carefully performed all calculations himself, and assigned specific tasks to the aircraft navigators.

We should state that this approach to mission-preparing aircrews has become the standard operating procedure in our outfit. Everybody takes part in performing calculations: both pilots and navigators. In preparing for a flight operations shift, we draw up a detailed navigator's plan, taking into account topographic and geodetic support as well as electronic support services. This is essential because a high degree of precision of navigation and weapons delivery can be achieved only if one works out in advance the essential correcting data for the aircraft's computers. Taking into account the requirements of guideline documents and on the basis of collective experience, the men of this squadron have devised an advanced method of route plotting, in accordance with which all essential auxiliary means utilized during aircraft navigation and weapons delivery are placed on the chart.

In view of the fact that in a combat situation it will not likely always be possible fully to utilize the automated navigation system, we devote particular attention to so-called classic navigation methods and the ability to perform visual orientation and ground track computation by heading, airspeed, and time [dead reckoning]. Toward this end aircrews prepare their flight charts taking into consideration all the requirements of documents articulating formal rules and regulations pertaining to flight safety and precision navigation.

Formerly we employed the following method of flight preparation. If aircrews were to fly the same training sortie, for example, navigation calculations would be performed in a centralized manner, by the most proficient navigator, while the other navigators would merely copy down the completed data. This eliminated random errors and deviations in individual calculations. Soon, however, it became clear that this practice was impeding the airmen's creative initiative and was engendering passivity and total dependence on others. On the other hand, he who regularly works with the navigation charts and performs the requisite calculations is continuously acquiring and reinforcing knowledge and skills and has greater confidence in the air. For this reason now every crewmember prepares individually for flights.

Military Navigator 3rd Class Sr Lt O. Bepalov, for example, always carefully and thoroughly prepares flight documents, thoroughly studies and calculates in detail every leg of a flight, each and every tactical device. All this of course takes time, but the effort is repaid a hundredfold. This officer accomplishes all tasks with good and excellent results. In spite of the comparatively short time he has been in the subunit, Bepalov has mastered many of the finer points of navigation and weapons delivery and has been certified to fly day or night in instrument weather.

Such a means of improving skills as navigation drill is very helpful to crew members. It involves working on mental calculation, solving wind triangle problems, calculating fuel consumption, and the like. The knowledge and skills acquired in the process of commander training are subsequently reinforced in the air.

My job frequently involves going up on check rides to test navigators' proficiency. The fact is that everybody experiences nervousness, especially if one is about to go on one's first long flight. And nobody wants to make a mistake, since it could place the entire aircrew in a difficult situation. Naturally aviation personnel endeavor to display aloft everything they have learned.

On one flight operations shift I was scheduled to go up on a check ride with Lt Yu. Demidenko. Soon after we had taken off and proceeded away from the airfield it became obvious that this officer was doing a poor job of monitoring radio communications and was being too slow in making calculations. He clearly lacked practiced skills. After this flight measures were taken to improve this navigator's proficiency.

In addition to the purely subjective costs, however, there are also objective costs involved in aircrew navigation training. One of these is training flights on thoroughly-familiar routes. Although we provide several variations for each flight operations shift, due to circumstances beyond our control aircrews frequently operate on a single or a maximum of two route variations. Although the first times through the young men do a thorough job with their navigation chart and navigator's gear, on subsequent flights, since they are familiar with the specific features of every route, they become guilty of unnecessary relaxation of demands. What is even worse, some officers display excessive self-assurance and complacency. In such instances we must warn the young airmen against complacency and persuasively explain to them that even on a well-known route one can hone one's skills working with the bombsight and navigation system and other navigation equipment if one approaches it in an innovative manner. Nevertheless, however, this is not the complete answer. We would like to appeal to command authorities and specialist personnel who monitor air traffic in and outside of the airbase terminal area to be more flexible in approaching the planning and scheduling of cross-country flights. I believe there is both capability and opportunity for this.

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## HELICOPTER PILOT PERFORMS HEROIC DEEDS IN AFGHANISTAN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 87 (signed to press 2 Dec 86) pp 10-11

[Article, published under the heading "Anticipating the 20th Congress of All-Union Komsomol," by Maj R. Rudenko: "His Heights"]

[Text] The mountains appeared impregnable and devoid of life when viewed from above. There were no signs of human habitation, not a single tiny piece of flat, even ground. A palisade of jagged, rocky crags soared skyward, separated by deep gorges. Far below, if one peered intently enough, one could make out the narrow, winding trace of the Alekhel trail. Ever since international imperialism unleashed an undeclared war against the Democratic Republic of Afghanistan, caravans bearing weapons and ammunition for the enemies of the April Revolution have been attempting to make their way in from Pakistan along this trail.

Gds Capt V. Kucherenko knew that there were bandit weapon positions sited in this area. That day, however, they had been searching in vain for quite some time to detect such positions. Nor did they spot any caravans.

Just as it was about time to head back, Gds Capt V. Damnitskiy, flying the lead gunship of a two-ship helicopter element, radioed: "I have been fired on. I can see a weapon position dead ahead. I can see another to the right, and another!..."

Damnitskiy's and Kucherenko's two-gunship elements immediately proceeded to attack. The dushman [rebels] realized that they had been spotted and opened fire, from 15 weapon positions simultaneously, it was later ascertained. Bursts from heavy-caliber machineguns sprayed to the right and left. But the helicopters were now over the weapon positions. The gunships silenced several machineguns with a heavy delivery of fire. They flew a second pass, and a third....

"Now we can go home," Kucherenko commented with a note of satisfaction, pulling his helicopter out of a dive.

Suddenly he saw another weapon position right out ahead. "Apparently it's an alternate position," Vladimir said to himself. "Usually the bandits set up

such positions on possible routes of withdrawal. I would like to go in and get it, but with what?"

"Skipper, we're out of ammo," crew chief Gds WO P. Burlaka reported, as if divining Kucherenko's thoughts.

"I know."

"How about trying to snatch the machinegun?" Vladimir said to himself. This would require putting at least one wheel into contact with the rock face. But it is both difficult and hazardous to hold a helicopter in a hover at an altitude of more than 3,000 meters. In addition, there might be dushman at or near the weapon....

Reporting his decision to the flight operations officer and the strike element leader, Kucherenko commenced a descent. Gigantic projecting rocks jutted up menacingly below the helicopter. How different this harsh mountain region was from the abundant greenery of the open spaces of his native Sumy Oblast!

...Vladimir had learned from childhood to understand and appreciate the beauty of the earth and to love labor. He worked with great eagerness in the fields, helped his mother with the vegetable garden, and cared for the orchard. And he could have become a pretty fair farm machinery operator or agronomist if he had not "become taken" with the sky, with flying. He read every book about pilots he could find in the village library, he worked on conditioning his vestibular mechanism, and he even hatched the idea of building his own airplane. Therefore nobody was surprised when after graduating from secondary school Kucherenko applied for admission to the Chernigov Higher Military Aviation School for Pilots imeni Lenin Komsomol.

His first step toward the heavens was unsuccessful. It brought him literally to tears. Was his dream really fated to remain merely that -- a dream? His mother did her best to console her son: "Maybe it's for the best, Volodya. You will go on to college and become an engineer. Not everybody is fated to be a pilot."

"Of course not," replied Vladimir, "but I am going to become one... you'll see!"

It is hard to say what the officer at the military commissariat saw in the young man's eyes when the latter returned the registration documents, but he took Vladimir completely by surprise when he suggested: "How about signing you up with the DOSAAF flying club?"

That same day Kucherenko wrote two applications: to the flying club and to the Sumy Chemical Combine personnel office, requesting that he be taken on as a boiler repair apprentice steam fitter.

During the day he worked at the combine and in the evening studied at the DOSAAF flying club, where he learned the rudiments of aerodynamics, helicopter design and construction, and the principles of flying a helicopter. Thus



Kucherenko the pilot was born in parallel with the birth of Kucherenko the worker.

Would he had ever guessed that 10 or 12 years later he would be mastering the complex art of flying over mountain and desert terrain, evading machinegun and missile fire with incredible maneuvers, or that he would be overjoyed at finding as a landing spot even a rock onto which he could put one of his wheels?...

...After the helicopter's landing gear had made contact with the mountainslope, dushman appeared near the weapon position. At first one and then another bandit proceeded to run toward the machinegun. His crew chief and copilot-navigator cut them off with aimed fire from assault rifles.

"Grabbing a bunch of spare AK magazines," recalled Gds WO P. Burlaka, "I jumped out of the helicopter and, moving in short bounds, ran toward the machinegun position. I spotted a dugout shelter next to the machinegun and ran over toward it. It contained dushman. I hosed them with my AK and jumped on top of the shelter. I tried to pick up the machinegun, but it was concreted in place. I don't know where I got the strength, but I managed to yank it out and drag it about 5 meters with the concrete block into which it was mounted. I couldn't drag it any farther, for the machinegun weighed twice my own body weight even minus the concrete. I heard the voice of Guards Senior Lieutenant Korchagin, who was running over to my assistance: 'We're surrounded!' Firing as we went, we somehow managed to drag the machinegun over to the helicopter and shove it into the cargo cabin. It took us some time to get ourselves aboard the shaking helicopter. But what about the pilot?! If the dushman attacked, we could at least take shelter behind rocks. But he had nowhere to hide. He could not even fire back -- both hands were occupied...."

Naturally any flight into a zone of active operations by dushman bands, let alone landing in such an area, is both difficult and dangerous. For this reason exceptionally stringent demands are imposed on pilots in command and all flight personnel as regards ensuring discipline and organization as well as teamwork and coordination within aircrews and aircraft elements. But this by no means shackles intelligent initiative by our airmen or their endeavor to achieve maximum effectiveness from each sortie. Unable to knock out a spotted bandit weapon position with fire from their helicopter's weapons, Kucherenko and his men found another way to take out this "hornet's nest," and I am quite sure that if this plan had not proven practicable, the helicopter crewmen would have come up with something else.

They could not leave and did not have the moral right to leave this weapon in the hands of the dushman. For this reason Vladimir made the decision to land close to the weapon position. If he had done otherwise, he would not have been that Kucherenko who was so well known in the squadron, whose boldness, tenacity, and flying skill have been an example for all personnel.

Capt V. Kucherenko's superiors and colleagues recalled dozens of instances when on the one hand Vladimir showed himself to be a careful and prudent, even a cautious pilot, while on the other hand, when the situation made it

necessary, he did not hesitate to make bold, critical decisions. When one analyzes each specific situation with the help of veteran helicopter crewmen -- participants in and witnesses to the recent events -- one begins to realize that first and foremost a strong sense of honor, precise calculation, and confidence in the capabilities of the aircraft and his crew stood behind this pilot's decision.

Gds Capt V. Kuzmin, who served with Kucherenko in the limited Soviet forces in the DRA, related one such incident to me: "At the request of our Afghan comrades, we were flying a mission which involved putting down a tactical assault force in a mountain area in which dushman bands were stepping up activity. The first motorized riflemen had barely left the helicopter when a wind gust picked up the aircraft and threatened to smash it against a rocky cliff. The pilot succeeded in turning the craft from the cliff and gaining altitude. Three men remained on the ground below, however. Who knows how things would have ended up if it had not been for Guards Captain Kucherenko, for dushman were close by. He brought the helicopter down without hesitation and snatched up the troopers right out from under the bandits' noses.

"A hero, in my opinion," Gds Capt V. Kuzmin went on, "is a person who in an extreme emergency situation proceeds as he is commanded by duty, honor, and conscience. We know Kucherenko precisely as such a person. And when Vladimir asked me to recommend him for probationary membership in the CPSU, I was most pleased to do so. He is a dependable pilot, fighting man, and comrade. I am sure that he will also be a fine Communist...."

"On one occasion an officer and an enlisted man were gravely wounded in a skirmish with dushman high up in the mountains," helicopter commander Gds Capt V. Levochkin recalled a recent event. "Their lives depended on getting to a hospital fast. But how could this be accomplished? We generally did not fly at night, except in emergencies.

"...The commanding officer summoned Kucherenko: 'I cannot order you. I realize that it is an impossible task to put down there, particularly in the dark. It's up to you....'"

Within minutes the crew was airborne. There was no problem reaching the destination point, other than the dushman machinegun and assault-rifle fire which accompanied them. These dangers they knew how to combat. But Kucherenko did not have a clear idea of how to manage, flying almost blindly, to ease the helicopter up to a steep mountain slope. Strong winds made it impossible to hover above the site in question. But people were waiting for them down below, including wounded.

"We're going to land," Vladimir informed his crew, trying not to give away his nervousness.

"But where, skipper?" Senior Lieutenant Korchagin asked uncomprehendingly.

Kucherenko remained silent and began his descent.

The rock cliffs loomed ever closer. Finally the helicopter gave a shudder, touching one wheel against a rock and, swaying back and forth, held position. Even the veteran crew chief's insides began to churn when he realized that the main rotor blades were threshing the air just a few dozen centimeters from the steep mountainside, while the tail boom was practically resting against a boulder on the edge of the precipice.

As soon as the wounded were on board and the helicopter was again airborne, Guards Captain Kucherenko asked his copilot to take over the controls.

"My legs are numb," he explained. "I have no feeling in them at all...."

I later asked Vladimir what he was counting on when he decided to attempt such a risky landing: his experience, or luck?

"Both," he replied. "To put it quite honestly, I had no other choice. Landing the helicopter provided the only chance of rescuing the wounded. And it was my duty to do everything possible to accomplish that."

Duty. Obligation.... Military duty, civic duty, internationalist duty -- it always has defined and continues to define that precise line to follow in daily life and military service, Kucherenko's activist position and attitude.

...Upon completing his studies at the DOSAAF flying club and earning the title of pilot-technician, Vladimir submitted a request that he be assigned to an aviation unit for his military service. When a problem with the requested assignment arose, he submitted a second, and then a third request to the military commissariat. Finally he was assigned to an Air Force regiment in the Kiev Military District.

"I liked life in the service right from the beginning," Gds Capt V. Kucherenko told me. "I liked the precise daily routine and the opportunity to do a lot of flying and interesting TDY assignments. At first there were a number of problems, it is true. From my very first days in the military I strongly felt a lack of knowledge of aerodynamics, tactics, rules and regulations pertaining to flight operations, and general military subjects. For this reason, in addition to mastering the job duties of a copilot-navigator and the scheduled commander training, I had to do a great deal of study on my own."

Vladimir worked hard and persistently to master flying and military skills during his tour of duty in the Kiev Military District, with the Group of Soviet forces in Germany, and later in Afghanistan. This officer's efforts were rewarded with the Order of the Red Star, a promotion in rank, and a job promotion. He became section navigation officer, helicopter commander, and subsequently senior helicopter commander.

Guards Captain Kucherenko is presently a section commander. He now has more to do and be concerned with. Things are not yet entirely as he would like them to be. And once again he must study. But now he is studying the art of the organizer, leader, and indoctrinator of subordinates. He is a born pilot, has a hardworking nature and a great deal of stick-to-itiveness; he will get results.

This story about Gds Capt V. Kucherenko would not be complete unless we said something about his family. He met Lena in Vladimir. They got married. First they had Olya, and later Natasha.

"If you only knew how much I missed them in Afghanistan," confessed Vladimir. "Every little bit of news from home was an important event. And when I received a tape as a letter from Nata and Olenka, believe me, this was a real occasion."

"It was also hard for us without daddy around," said Lena, embracing her little daughters. "We were worried about him. When we said goodbye Volodya promised to take care of himself and assured us that it was not at all dangerous there. But I knew that there was trouble in Afghanistan, and my husband is not a person who will walk away from difficulty or danger."

"You can get used to anything," said Gds Capt V. Kucherenko, "except for the feeling that from liftoff to touchdown you are in the gunsights of an enemy who is lurking somewhere out there. Don't believe those people who tell you that there is nothing to worry about in Afghanistan. It is frightening. It is simply awful to see the torn bodies of women, children, and the elderly, as well as the desecrated land. But awareness of the fact that you should and can help these people in their struggle for a life of peace and tranquility forces one to overcome the instinct of self-preservation and to concentrate one's entire will and attention on carrying out a flight assignment."

Gds Capt V. Kucherenko bears with honor the title of soldier-patriot and internationalist. The courage and skill he has shown in performance of his internationalist duty in the DRA as well as this pilot's military labor are greatly appreciated by the homeland: he has been awarded the title Hero of the Soviet Union.

These days, when Komsomol organizations are engaged in active preparations for the 20th Congress of All-Union Komsomol, young party member Hero of the Soviet Union Guards Captain Kucherenko can frequently be found in the young people's groups in units of the Leningrad Military District, at enterprises and schools. He is doing a great deal of work in the area of military-patriotic indoctrination of youth and mobilization of young people to implement in a worthy fashion the decisions of the 27th CPSU Congress and reliably to defend the great achievements of socialism.

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## FAC SEES ACTION IN AFGHANISTAN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 87 (signed to press 2 Dec 86) pp 12-13

[Article, published under the heading "Into 'Heirs of October' Competition," by Maj V. Zdanyuk: "Zone of Responsibility"]

[Text] The flight operations shift was coming to an end. No more aircraft were taking off. Pilots were returning to the field after completing their flight assignments.

Terminal-area controller Sr Lt Vadim Korochkin was performing calmly and confidently as always. On the radar display the combat jets appeared like tiny fireflies. The lieutenant kept firm mental track of the heading and altitude of each "firefly" and issued the pilots concise, precise instructions.

Another aircraft suddenly appeared at the very edge of the display. In due course it would be entering Senior Lieutenant Korochkin's zone of responsibility. Vadim glanced at the flight operations schedule and listened to the radio traffic. "Aleksandr Malyarchuk," he determined, hearing the pilot's callsign.

He is tied by firm bonds of friendship to the brothers Lts Aleksandr and Sergey Malyarchuk. They are practically the same age, have common interests and hobbies, and are also neighbors. But they are not Vadim's only friends. He is open, kindly, and sociable by nature. This is also a necessity of his job. A terminal-area controller must know every pilot well: their flying ability, how they conduct themselves in nonroutine situations, and how they respond to a change in the air situation, for at times even a tactical control officer's intonation is of considerable significance....

Aleksandr Malyarchuk is a fledgling pilot and for the present requires increased attention.

Senior Lieutenant Korochkin radioed to the combat jet: "057, you are on heading, watch your altitude."

Two or three more brief instructions, and Malyarchuk's aircraft was headed precisely over the outer marker. He soon was safely on the ground.

Vadim was monitoring the landing approach of the combat jet next in the sequence when he heard an alarmed voice: "031, pressure dropping...."

The senior lieutenant's skilled eye immediately pinpointed the aircraft in question on the radar display. "A veteran pilot," the thought flashed through his mind. "He will not become flustered. He has plenty of altitude...."

Korochkin ordered him in a calm, firm voice: "031, discontinue training sortie. Proceed to altitude.... Turn to heading... and proceed to field...."

Vadim performed with precision, guiding the combat jet back to the field. Soon he had also skillfully brought in other aircraft.

The radar display glowed in a soft greenish light. There was not a single aircraft in the terminal-area controller's zone of responsibility. Flight operations were over. Korochkin leaned back in his chair and sighed with relief. He switched on the fan and bathed his flushed face in the cool airstream.

Vadim gave another glance at his scope. His zone of responsibility.... An area of airspace extending several tens of kilometers. He was responsible for everything taking place in this airspace, on the approaches to the airfield. This was the case if one were to follow the letter of the tower controller's manual. But he interprets it more broadly, as a party member's responsibility for the common cause of increasing the unit's combat readiness and flight safety. It cannot be measured in kilometers. There is a single measure -- party and civic maturity.

Vadim Korochkin was fully aware of the responsibility borne by him, a Communist and officer, during his tour of duty as a member of the limited Soviet forces in the Democratic Republic of Afghanistan. He himself requested duty in the DRA. He wanted to put his character to the test, to assist their friends the people of Afghanistan with practical deeds in defending the achievements of the April Revolution. He, a person reared by the Soviet system and educated in our ethics, morality, and the principles of humanism, could not remain indifferent while aware of the atrocities being perpetrated by the bandits and their accomplices on Afghan soil. He learned from the newspapers and television about the outrages being perpetrated by the enemies of the revolution. And soon he saw with his own eyes what the "defenders of Islam" were capable of doing.

...He entered a remote mountain kishlak [village] together with a motorized rifle subunit when the dust from dushman [Afghan rebel] grenade bursts had not yet settled and the remains of a destroyed school were still smoking. The broken, mutilated bodies of men, women, old people, and children lay sprawled on the village square.

Nor would he ever forget another day. The command authorities had received a disturbing report: a Soviet subunit had been ambushed in a deep gorge. They



needed help. The group was headed by Maj Adam Aushev, older brother of Hero of the Soviet Union Ruslan Aushev. It also included forward air controller Lieutenant Korochkin.

They headed out into the deepening dusk. They proceeded in single file. The narrow trail rose more and more steeply toward the pass. The going was difficult. It was pitch black, and they were proceeding across rocky talus. Vadim was carrying a backpack, field gear, a radio, and an assault rifle.... Sweat was trickling into his eyes, and it was becoming increasingly more difficult to breathe. His heart was pounding so hard that it seemed as if it was about to burst out of his chest. He wanted to sit down on the hot stones and take a breather. But before his eyes he could see that awful scene he had witnessed in the village: bloody bodies with eyes gouged out, and a smoldering classroom globe. He kept walking....

When dawn broke over the mountains, the party had already reached the pass. They took a short halt and cinched up their gear. They then hit the trail again. But now they were heading down a steep slope, into a gorge, the dark maw of which harbored a troubling hint of warning.

They practically reached the spot where the Soviet platoon was fighting surrounded before they were spotted. Suddenly they began taking fire from three heavy-caliber machineguns. The dushman were firing in short bursts. Vadim went prone on the dusty trail and lay there with his head hugging the ground. He heard the whistling of bullets for the first time.

"They pretty well have our range," he heard Aushev's calm voice alongside. "We'll never smoke them out without helicopters. Call in air!"

Korochkin crawled behind an enormous block of basalt, quickly made his radio ready, and established communications contact. Soon they heard the rumble of helicopter engines up the gorge. Vadim lit an orange smoke pot, marked his position, and radioed the element leader.

"There is a mountain 2 kilometers due west of me. There is a heavy-caliber machinegun at the site of a demolished barn," he gave his first target designation.

A pair of helicopters banked sharply into the attack. Within a few minutes the dushman machinegun was silenced for good. There was now nothing but heavy black smoke and a cloud of dust above the site from which it had been firing.

The two other machineguns proved to be more difficult to spot. The echo from their bursts swept back and forth between the cliffs, breaking up and becoming lost. Vadim poked out from behind the rock, exposing his upper body, and peered intently at the gray mountainslopes. He suddenly caught sight of a flash on a narrow cornice at the top of a steep cliff, as if somebody had flashed a reflected sunbeam. The echo of shots reached him several seconds later. He saw another flash. There was no doubt about it -- that was a weapon position, with another one next to it. Korochkin glanced at his compass, estimated the distance, and radioed the targets' coordinates to the helicopter element leader.

After the battle Major Aushev shook Vadim's hand: "You really saved our bacon. When things got hot I thought at first that you would lose your composure. After all, it was your first time in combat...."

Lieutenant Korochkin's next trip into the mountains came close to being his last. He was proceeding with a motorized rifle company to the aid of an Afghan tsarandoy [people's militia] detachment which was in trouble. Bandits hit the Soviet soldiers with machinegun fire. They had to call in by radio a pair of "bumblebees" -- helicopter gunships. Positioned on a mountaintop between huge rocks, the FAC provided them with fire adjustment instructions. One dushman weapon position was neutralized and then another.... Suddenly there was an explosion. A mortar round had burst several meters from Korochkin.

Later they told Vadim that he must have been lucky. The blast wave smashed him against the rocks. He was immediately on his feet. And then he went right down again: machinegun bullets whistled overhead. He looked around. His radio was smashed. His duffel coat was in tatters. First he moved one arm, then the other. Not a single scratch....

The helicopters were droning in orbit overhead. They were firing at random. "But what can I do without a radio?" Vadim said to himself, angry at his helplessness. "Not a thing.... Hey, wait a minute! I've got signal flares!"

Peering intently at the cliffs, the FAC located where the mortar crew was hunkered down and fired flares in that direction. The helicopter crews, veteran airmen, correctly interpreted the meaning of the flares, and fired a salvo of rockets at the dushman. The band was smashed.

It is no easy matter to guide rotary-wing and fixed-wing aircraft to targets in mountains. One loses one's normal sense of range and distance. It is also sometimes difficult to determine by sound where a dushman is firing from. Nor does one always mark one's location with a smoke pot: this serves as the point of reference not only for friendlies but for the bandits as well. But regardless of the situation, Korochkin always remembered that he bore responsibility for accomplishment of the mission, for people's lives. In such a situation he was constantly devising ways to make things easier for the pilots!

Once dushman had pinned to the ground with heavy fire a company led by Sr Lt Sergey Ivanov (incidentally, he is presently serving in the same district as Vadim and was awarded the Order of Lenin). They were placing aimed fire from close range, keeping everybody's head down. Lieutenant Korochkin was positioned with a radio a bit to the rear of the company disposition. He called in a pair of helicopters. But how could he guide them to the target if he could not give away his own location and there were no prominent landmarks anywhere in the vicinity?

Vadim placed his compass on a rock and established radio contact with the element leader.

"021, you are proceeding in my direction," he calmly stated. "Heading.... Turn right.... I am right under you. 2 kilometers from my position, bearing..., there is a weapon position."

The helicopter pilots followed his instructions precisely and placed accurate fire on the target. Korochnik established radio contact with the company commander.

"Outstanding!" Ivanov's buoyant voice was heard through the chatter of assault-rifle bursts. "Can you bring in a strike about 50 meters closer to us?"

The two helicopters swept in on a second run, blasting their targets.

"Pass on my thanks to the 'bumblebees'!" the company commander shouted into his radio. "A real precision job! It deafened us a bit, but the 'ghosts' [Afghan rebels] are hightailing it!"

The company burst into the ruins of the old fort right on the heels of the terror-stricken dushman and seized the high ground.

The radio is not the forward air controller's only weapon. During his tour in Afghanistan Vadim never parted with his assault rifle, a true friend. And when the situation required, he would also soften things up with grenades.

Once he and a group of soldiers were cut off from friendly forces in a half-demolished village. They took up a position in a mud hut -- a cube-shape structure with a flat roof. Korochnik assumed command of this little garrison. He directed the defense with calmness and skill. All day long and throughout the night they fought off the dushman, firing through narrow windows reminiscent of embrasures. It took friendly forces 24 hours to fight their way through to them.

Those who knew Vadim before Afghanistan say that he had changed appreciably: he had grown and matured. Another star was also added to his shoulderboards. When he puts on his dress uniform jacket, a ruby-hued Order of the Red Star gleams on his chest.

But the main thing is that he learned to hate our enemies and to love even more his homeland, the life and career he had chosen following the example of his father and older brother -- military aviators. He had learned to love them with awareness and actively. He had learned to defend good and fight evil. Particular demands are placed on him, who has experienced Afghanistan. There he was always out in front, under fire. Here too, in his regiment, he does not pass the buck of responsibility to others. He provides an example in performance of duty and in training, as befits a Communist and an officer.

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## NEW BOOK ON APPLYING "HUMAN FACTOR" IN THE MILITARY

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 87 (signed to press 2 Dec 86) p 17

[Review, published under the heading "Implementing the Course of the 27th CPSU Congress", of book "Zashchita Otechestva: Chelovecheskiy Faktor" [Defense of the Homeland: The Human Factor] by A. D. Lizichev, Voenizdat, Moscow, 1986, 112 pages, 25 kopecks ("Following the Course of the 27th CPSU Congress")]

[Text] The above is the title of a new book published by USSR Ministry of Defense Voenizdat. Its author is Army Gen A. D. Lizichev, chief of the Main Political Directorate of the Soviet Army and Navy. It is stressed in the introduction that the 27th Congress of the Communist Party of Soviet Union constitutes a most important event for our country and the USSR Armed Forces. It has provided a powerful impetus toward further revolutionary renewal of all domains of societal affairs as initiated by the April (1985) CPSU Central Committee Plenum and is of truly historic significance. The main political result of the congress is the congress-adopted and ratified general line of party domestic and foreign policy, a policy line aimed at accelerating our country's socioeconomic development and strengthening world peace.

Discussing the party's course of strategy in the chapter entitled "At a Sharp Turning Point," the author reveals its essence. It is first and foremost acceleration of the country's socioeconomic development, which has been prepared for by all preceding development. The party considers fundamental acceleration of scientific and technological advance to be the main instrument for accomplishing intensification of the economy. Implementation of a well thought-out, integral, strong social policy and increasingly fuller affirmation of the principle of social justice constitute a powerful means of acceleration. Further improvement of societal relations is an essential condition for accelerating our country's development.

The leadership role of the CPSU is logically increasing in the affairs of Soviet society under the new historical conditions. The party defines its principal policy goals in the area of national defense taking into account the complex international situation and the tasks of accelerating socioeconomic development. The 27th CPSU Congress stressed the need to continue working tirelessly to strengthen the homeland's defense capability and to ensure balanced, dynamic development of all elements of the combat potential of the



USSR Armed Forces -- military skill and a high degree of technical equipment, ideological staunchness, organization and discipline on the part of personnel, and their faithfulness to patriotic and internationalist duty.

The experience of history attests to the fact that the Communist Party itself also is continuously evolving and improving together with the forward movement of the socialist society, which is increasing the party's leadership role.

The CPSU Party Rules ratified at the 27th CPSU Congress, with the adopted revisions, reflect the new, tough demands on level of party leadership and of all party activity in conformity with the period through which our society is going. For example, in conformity with the requirements of the CPSU Party Rules, army and navy party organizations have begun to approach selection of candidates for party ranks in a stricter and more rigorous manner. Preference is given to military personnel of leading military occupational specialties, those who directly teach and indoctrinate personnel and who are in key positions for maintaining a high degree of combat readiness. Recently there have been more vanguard officers among persons accepted to probationary membership in the CPSU, particularly pilots and specialist personnel who service and maintain the equipment. Other points of the CPSU Party Rules are also reflected in the affairs of party organizations.

The author discusses in greater detail in the chapter "Restructuring of Party Work" what has been accomplished and what still remains to be done in this area. He devotes particular attention to placing greater emphasis on the human factor.

As applied to conditions in the army and navy, the human factor represents the operation of people's intellectual and physical energies in the domain of defense of the socialist homeland against imperialist aggression and manifestation of ideological-political, moral-psychological, emotional-volitional, and physical qualities of Soviet military personnel and military collectives.

The author emphasizes that activation of the human factor urgently requires intensification of party influence on all domains of people's activity as well as restructuring of party work. This is a multilevel process. It encompasses people's consciousness and psychology as well as the immediate organization of their activities.

The political aspect of restructuring is determined by the necessity of analyzing in a broad, Leninist manner the degree of acuteness of the period we are going through and elaboration of a program of action to implement a policy of acceleration and achievement of excellent results by each and every collective and each member of each collective. In order for decisions for the future to be maximally accurate and of crucial importance, and for specific actions to be purposeful and effective, it is necessary to draw lessons from the past, as was done by the 27th CPSU Congress. The author states the first lesson -- the lesson of truth. The second lesson is purposefulness and determination in practical activities, businesslike efficiency, and unity of word and deed. The third main lesson is that the success of any undertaking

is determined to a decisive degree by how actively and consciously the masses take part in it.

The entire experience of the CPSU indicates that people cannot be led to perform great deeds without accomplishing a substantial change in their psychology, without developing the desire and ability to think and act in the new manner. The psychological aspect of restructuring consists in this. The party places prime importance on matters of improving the moral-psychological atmosphere in party organizations and in workforces, including military collectives.

The essence and substance of the organizational aspect of restructuring lies in utilizing and developing to a maximum degree the excellent qualities of personnel and placing in the service of combat readiness everything which modern equipment and weaponry can provide. Organization of execution and implementation of party directives, centrally-issued guidelines and particular decisions constitute the main element in party work.

Cadre policy is assuming key significance in restructuring of political work and in intensifying the human factor. In a broader sense we are talking about forming, shaping, and educating cadres of a new type. The question should be stated as follows: each individual is to devise new approaches to the job, a new way of thinking, and a new psychology.

The situation demands first and foremost an increase in party influence on military personnel standing alert duty, including aviation personnel. The efforts of commanders, political workers and party organizations are directed first and foremost toward forming in personnel the ability to carry out an operation order in any and all conditions, to respond resolutely and promptly to any challenge by the adversary.

Army Gen A. D. Lizichev spells out the tasks of Komsomol in the military in the area of intensifying the human factor. The most important, fundamental task of All-Union Komsomol consists in communist indoctrination of youth and forming in military personnel a profound understanding of the necessity of reliably defending the socialist homeland. The author discusses ways to improve the forms and methods of activities of Komsomol organizations in the military.

The chapter entitled "A Foundation of Strong Moral Principles" deals with problems of ideological support for activating the human factor. The author stresses that this consists essentially in thorough study by Soviet military personnel of the decisions of the 27th CPSU Congress and in explaining to personnel the enduring significance of the course of policy directed toward accelerating our country's socioeconomic development in order to improve socialism and defense of the homeland.

The task of forming a scientific world view in Soviet citizens, including Armed Forces personnel, has taken on particular importance in present-day conditions. To form such a world view means achieving an organic fusion of profound knowledge of Marxist-Leninist theory,, solid communist convictions, sociopolitical activeness and moral purity, civic responsibility and sincere



generosity, love of the homeland, readiness and willingness to defend its interests. In the final analysis communist conviction is the main thing which motivates and determines the conduct of the Soviet serviceman, both in peacetime and at a time of grim ordeals.

Political instruction is one of the leading means of forming a communist world view in personnel and of satisfying servicemen's spiritual and intellectual aspirations. The author gives recommendations on how to organize political instruction in a more precise and efficient manner and to make it richer in content, more purposeful and more diversified.

The party links the moral fiber of the builders of communism with excellent moral underpinnings, honesty, conscientiousness, and decency. The principles and standards of communist ethics and morality have become a firm part of our daily lives. Fusing and coalescing with the ideological-political underpinnings of society, they serve as a powerful stimulating force to generate the most effective energy -- the energy of intellect and hearts, and give a lofty sense and meaning to all the actions and deeds of Soviet citizens. The author discusses in detail the ways and methods of affirming the principles and standards of communist ethics and morality in the conduct of army and navy personnel. He places particular emphasis on the indissoluble bond between word and deed.

The author devotes considerable attention to efforts aimed at developing in military personnel a high degree of political awareness and alertness, the ability to appraise societal phenomena from a clear-cut class position and to stand up for the ideals and spiritual values of socialism.

The party considers organization and discipline on the part of personnel to be among the components of the combat potential of the Armed Forces, devoting paramount attention to their further strengthening. This is the topic of discussion in the chapter entitled "Strengthening Discipline -- Increasing Combat Readiness." The author characterizes discipline as a political and moral-ethical category and discusses the forms and methods of instilling and strengthening discipline. He points out that the human factor is manifested in strengthening discipline first and foremost in the positive example of commanders, political workers, all officers and party members, and in their daily flawless observance of all the requirements of regulations without exception. The one-man commander plays a decisive role in strengthening discipline and in indoctrinating personnel.

In conclusion the author stresses that high-quality accomplishment of operational and combat training tasks and plans should constitute a specific response by army and navy personnel to the historic decisions of the 27th CPSU Congress. Main emphasis must be placed on further enhancing the role of the human factor in accomplishing all tasks.

This book is intended for command personnel, political workers, party and Komsomol activists. It will help them in the area of restructuring and in training and indoctrination of personnel.

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## FLIGHT OPERATIONS RADAR, RADIO NAVIGATION AND COMMUNICATIONS SUPPORT SERVICES

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[Article, published under the heading "Know-How of the Best Into Practical Training," by V. Zhderov: "Flight Operations Electronic Support Services"; first paragraph is AVIATSIYA I KOSMONAVTIKA introduction]

[Text] Lt I. Burtsev, cadets V. Nechitaylenko, S. Ukhnin and other readers have expressed interest in air traffic controller radar services. Our correspondent asked officer V. Zhderov, an experienced flight operations electronic support services specialist, to discuss the features of this category of aviation personnel combat activities.

The tactical air exercise was in full swing. Specialist personnel were working at a high pitch of intensity at the fighter regiment command post. Success depended to a considerable degree on their skill, quickness and efficiency. On one occasion several reflected signals from air targets and aircraft heading out for the intercept were crowded in a narrow sector of the radar display. Veteran tactical control officer Capt A. Chernykh simultaneously guided several fighters, closely watching developments on the radar display.

In such a complex situation any superfluous word constitutes a serious hindrance. For this reason only the radar operator passed on in a muffled voice information on the aircraft. Suddenly officer Chernykh spotted a new blip on the radar and immediately ordered his men to provide altitude data on the "aggressor" aircraft.

Upon receiving this order, flight operations electronic support services specialist personnel promptly passed on the required information to the tactical control officer. This mock air engagement ended in a sure victory for the fighter pilots.

This incident from the combat training of aircrews and flight operations support services specialist personnel is highly instructive. It confirms that in present-day air combat one can achieve success primarily through precision coordination among these personnel. Today, when third- and fourth-generation aircraft are in the Air Force operational inventory, commanders and staff

officers are constantly concerned with improving the methods of their employment taking into account effective, high-quality flight operations electronic support services -- a special category of operational and combat support for Air Force subunits and units. Without this it is difficult fully to utilize the increased tactical and technical capabilities of today's military aviation.

Electronic support services [radiotekhnicheskoye obespecheniye -- "radiotechnical" support] (RTO) are provided at all phases of flight operations, from takeoff to landing, and constitute a component part of control, navigation, and combat flying in various weather conditions. These support services enable command post teams continuously to monitor the development of events aloft and to ground-assist aircrews.

Once a long-range bomber crew was returning to base following a combat training sortie to the range. The unforeseen happened: en route weather deteriorated suddenly and critically, and the aircrew found itself in a very difficult situation. Flying at night and with heavy cloud conditions makes navigation difficult. The bomber, like a storm-tossed ship at sea, alternated between dropping in elevator-like downdrafts and shaking from side to side. In addition, one of the navigation instruments began giving faulty readings.

In short, at this point a great deal depended on the air traffic control team and the flight operations electronic support services specialist personnel. The situation and time considerations required that they immediately step in and give an emergency assist to the crew, particularly since the duty weather forecasters were calling for a heavy snow squall on the far approaches to the field. It would be hazardous to redirect the aircraft to another field, because they were low on fuel.

At this point the aircraft began to receive over communications and RTO frequencies instructions by the flight operations officer and DME-localizer and glideslope signals, as well as data from other equipment, making it easier to guide the aircraft to the field in conjunction with the aircraft's long-range and short-range navigation systems. All this helped the navigator and aircraft commander, faced by a very difficult situation, bring their ship precisely to their home field and accomplish a safe landing.

Electronic support of flight operations is based on a well-established system, which includes unit communications and electronic support facilities as well as unit command and control agencies, deployed in conformity with the missions being performed by military aviation. The foundations of this system were first laid down in the mid-1930's, were improved and refined in the prewar years, and stood the harsh test of combat in the crucible of the Great Patriotic War. The highly-mobile nature of combat in the last war made it necessary to develop airborne automatic direction finders with loop antennas and to employ ground nondirectional radio beacons. Navigation with the assistance of ground radio direction finding stations came into widespread use in all air components.

The postwar period of Air Force development, marked by a transition to jet-propelled aircraft, nuclear and missile weapons, required a different approach



to electronic support of flight operations. The process of controlling aircrews in the air and on landing approach became steadily more complex as one generation of aircraft was replaced by the next. Principal difficulties arose in connection with an increase in aircraft range and speed. As a consequence of these changes, airspace monitoring by ground facilities began to be accomplished with new electronic facilities.

Today we differentiate radar support services (RLO) and radio navigation, communications and lighting services (RSTO) within the structure of "radio technical" facilities. RLO is an aggregate of measures directed toward accomplishing the tasks of detection, identification, and tracking of air targets, prompt and timely provision of data to command and control facilities, precise guidance of aircraft (helicopters) to designated targets, as well as organization of efficient monitoring of flight operations. It includes radar facilities [stations, posts] and automated control systems. RSTO performs tasks pertaining to control and combat employment of aircraft, navigation, target designation, aircraft takeoff and landing, flight operations monitoring and control in terminal areas, as well as provision of capability to operate at reduced minimums. It consists of short-range and long-range radio navigation subsystems, long-range radio direction finding facilities, approach and landing support facilities, and facilities for maintaining uninterrupted radio communications. The RLO and RSTO component systems do not operate in isolation from one another. They are established taking into consideration integrated utilization in the interests of maximum efficient and effective combat and flight operations support for military aviation of the USSR Armed Forces and the Warsaw Pact member countries.

The new, revised CPSU Program stresses that the party will continue in the future unfailingly to concern itself with ensuring that the combat potential of the Soviet Armed Forces comprises a solid fusion of military skill and a high degree of technical equipment, ideological fortitude, organization and discipline on the part of personnel and their dedication to patriotic and internationalist duty. We have at our disposal everything necessary to carry out the party's instructions. We not only have modern electronic systems but also outstanding specialist personnel, the majority of whom are graduates of service academies and higher military schools. More than half possess specialized engineering training. The finest officers include V. Zhelyabin, V. Sharunov, V. Nikolenko, V. Tikhenko, and others. They possess a high degree of ideological conditioning, profound knowledge, and solid skills. This enables them and their subordinates successfully to master complex radar equipment and communications gear and to utilize it skillfully in a complex mock combat environment.

The endeavor by communications and RTO personnel to build upon the combat fame of the older generations and to implement the decisions of the 27th CPSU Congress in the best possible way is graphically manifested in the course of daily training, in efficient support of flight operations, and in improving technical knowledge and tactical proficiency.

Fine training facilities have been established in Air Force subunits for training highly-proficient RTO specialist personnel. In the collective headed by officer V. Kulagin, for example, classrooms are equipped with training

aids, posters, working models, wired displays, and sophisticated training and simulator equipment. Electronic flight operations support specialist personnel can use this equipment not only to practice tuning and adjusting units and stages but also in correcting malfunctions. This heightens their interest in classes and training sessions and enables them to gain a deeper understanding of the physical processes taking place in complex electronic equipment.

In the subunit headed by experienced ground approach radar system chief Capt V. Pogorelkin, from the very first days after young GCA specialists arrive, they attend regular training sessions involving combat training flight operations with local terrain features and filmstrips. This enables surveillance radar operators, for example, quickly to master the grid overlay and to acquire skills in sure position orientation on the radar display.

They follow the practice of assigning young specialist personnel to flight operations support paired with high proficiency-rated operators. As a result the experienced men pass on skills to their younger comrades, keep an eye on their development, and help them become broken in more rapidly. This method, alongside the basic method of stage-by-stage forming of skills and abilities, is widely used at many Air Force bases in training personnel both principal and related military occupational specialties, as well as in the process of preparing for proficiency rating tests.

Recently communications and RTO subunits have begun more fully utilizing daily routine combat training for purposes of instruction. Toward this end Capt V. Posokhov, V. Zhelyabin and many other experienced methods experts organize the training and indoctrination process in such a manner that one can not only work on meeting performance standards but also properly condition the men's volition and develop stamina, boldness, aggressiveness, and cautiousness in personnel, incorporating in advance work on these tasks into the schedules of forthcoming training activities and tactical air exercises.

When a training drill is being held in subunits, personnel do not know in advance what targets the regiment's aircrews will be working against and how they will be setting up the landing approach upon completion of the training sortie. All missions are refined and detailed in the process of the flight operations shift -- just as things will develop under actual conditions. Training situations are prepared skillfully, taking into account the element of surprise. They include various tactics and devices the potential adversary may employ. In addition, the ground environment is also made considerably more complex, and various scenario instructions are given putting certain specialist personnel and RTO facilities out of action. Such training inevitably produces good, stable results in the course of flight operations shifts and tactical air exercises.

Success in ensuring high quality of flight operations and flight safety is inconceivable without adopting the most effective forms and methods of training military personnel. A specific system of training highly-skilled specialists has been developed in our communications and RTO subunits. First of all personnel go through a job aptitude and psychological selection process. This process is handled as a rule by boards which contain the finest

officer-methods experts. Employing specially devised tests and programs, they determine the men's job aptitude for mastering a given RTO specialty. After this, training groups are formed in the process of medical and job aptitude selection. Primary factors for consideration are a person's state of health, physical fitness, as well as ability rapidly to analyze an air situation.

The training process is organized in such a manner that from the very outset specialist personnel learn carefully to inspect and flawlessly to switch on the equipment and monitor its operation. Mistakes are eliminated by sequential performance of all operations with the aid of specially prepared diagrams which contain instructions on work procedures, techniques, and sequence.

Adoption of this method also required a certain restructuring of the training process. This considerable job has really paid off: fine results have been achieved by the subunits commanded by officers V. Kulagin, V. Pogorelkin, and others.

The method of individual assignments, which specify topics to be studied and timetables for completion, is also extensively employed in RTO subunits. Monitoring and verification are performed by platoon and company commanders, who grade the specialist personnel.

Close attention should be devoted to training inexperienced officers and officers who have recently been promoted to higher positions. The specific features of RTO subunits require that they become skilled, highly-qualified leaders in a very short period of time and are able to ensure a high degree of effectiveness in utilizing the manpower and equipment entrusted to them. For this reason their development and process of professional maturing should constantly occupy the attention focus of superior officers as well as party and Komsomol organizations.

Methods councils and conferences make a substantial contribution to the campaign for excellent quality of flight operations support and flight safety. The following principal areas can be specified within their area of activities: development of job competence in leader personnel, organization of the training and indoctrination process with subordinates, and technical training. This makes it possible to resolve in a more skilled manner matters pertaining to combat training and flight operations support, to teach methods expertise to young commander personnel, to develop solid instructor skills in this personnel, more thoroughly to analyze deficiencies, and more rapidly to incorporate all new and advanced elements.

We should like to make particular mention of objectivity in evaluating the level of proficiency of flight operations electronic support specialist personnel. Implementation of the principle of objectivity presupposes creating conditions whereby a person's individual qualities can be fully manifested with all characteristic features. In other words, the conditions for proficiency rating testing should not be too easy, nor should they be excessively complex.



In our RTO subunits the time schedule for examinations is communicated to specialist personnel in advance. Duty rosters are adjusted in connection with this, political indoctrination work is performed, and the mobilizing force of socialist competition and the campaign for high-quality accomplishment of adopted pledges are utilized. And personnel test results are promptly communicated to all personnel.

It was established based on the experience of our finest crews that the graphic method is the most effective method of recording results of preparation for tests. Providing maximum clarity of depicted material, it makes it possible to spot in a prompt and timely manner typical mistakes by specialist personnel, to analyze their causes, and to determine the most expedient ways to correct them. In addition, the crew commander prepares and displays at his men's work stations a schedule of personal achievement of tasks and performance standards by each specialist. This makes it possible to develop competitiveness in the collective to an even better degree.

A record of accomplishing tasks and meeting performance standards in the subunit is also maintained for each crew, not graphically but by preparation of tables. A special achieved results sheet, prepared by command personnel, is posted each month. On the basis of this data, a commander reports to higher authorities performance results on assigned tasks and performance standards both by the subunit as a whole and by each RTO specialist.

The more complex an activity is, the higher its degree of organization should be. An important role here is played by a well-planned daily routine, which makes it possible precisely to schedule the time required for practice and drill sessions, classes on theory, and various engineering and housekeeping/administrative activities. Uniform political, specialized and tactical training days and hours have been designated in all RTO subunits, tailored to the specific features of the deployment location and assigned missions, for all platoons and companies. Considerable importance is attached to the conduct of training sessions in one's occupational specialty, which also increases the effectiveness of combat training of RTO specialist personnel.

On the basis of the experience amassed by officers V. Kulagin, V. Tikhenko, and others, we can recommend the following sequence and procedure of personal preparation by the training instructor pertaining to developing teamwork and coordination by operating teams and crews: first gain a clear understanding of the sequence of actions by each specialist, memorize them and, after this, perform all procedures. This method will help the officer monitor the actions of his subordinate and, if necessary, will help in demonstrating a given work procedure on the equipment, which subsequently will naturally come in handy for conducting a knowledgeable analysis and critique session.

Matters pertaining to the combat readiness of RTO personnel and equipment constantly occupy the center of attention of command authorities, party and Komsomol organizations. By personal example, Communists and Komsomol activists inspire the men to exemplary flight operations support and earnest performance of military duty in the area of guarding the sacred borders of our socialist homeland. The men of RTO crews and subunits are responding to the



decisions of the 27th CPSU Congress with a further increase in vigilance and combat readiness, with strengthening of military discipline, achievement of new successes in military labor and exemplary flight operations support.

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## SOVIET HELICOPTER MAINTENANCE OFFICER IN AFGHANISTAN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 87 (signed to press 2 Dec 86) pp 20-21

[Article, published under the heading "They Were Decorated by the Homeland," by Maj V. Dolgishev: "Hot Spot"; first paragraph is AVIATSIYA I KOSMONAVTIKA introduction]

[Text] "You, dear comrades, have been educated by our revolution, the party, and by Komsomol. Patriotism and courage, valor and military honor have been inherited from your fathers and grandfathers, from the older revolutionary generations. From the very first days of its existence, the Workers' and Peasants' Red Army was an army of internationalists. It has carried these traditions through the crucible of the most severe ordeals. Soviet servicemen will always be faithful to them."

From a message of greeting by the CPSU  
Central Committee to servicemen-  
internationalists returning from the  
Democratic Republic of Afghanistan

The roar of turbines rose in pitch, and the aircraft proceeded to climb. Maj N. Bosykh was on his way home from Afghanistan. This officer was leaving an ancient land which counterrevolution and imperialism had turned into a bleeding wound. A new life is taking root in the DRA in a savage struggle against forces of reaction. Daily risking their lives, our soldier-internationalists are helping a friend, the people of Afghanistan, defend its independence and freedom as well as the achievements of the April Revolution.

The Afghan land glided by below, baked by the sun, wrinkled by jutting mountains, with infrequent green vegetation sequestered in its valleys. This officer had left a bit of his heart here. His thoughts returned again and again to those busy days of combat, to those people with whom he had been carrying out his internationalist duty.

Once a helicopter had "struck" a mine in a narrow mountain gorge. It was escorting a Soviet-Afghan column, providing air cover. An armored personnel carrier drove over a bandit-emplaced landmine. The ground erupted in flame, and the low-flying helicopter was struck by a hail of rock fragments. The

main rotor sustained serious damage: several pieces of blade were sliced off as if by a knife.

The crew succeeded with great difficulty in setting the craft down onto a small landing site. Soon a team of maintenance personnel led by Maj N. Bosykh arrived at the site.

The merciless southern sun had made the helicopter's skin extremely hot to the touch. The tail boom was too hot to touch, but it was necessary to get into it. It was difficult to breathe. Major Bosykh's smock soon became bathed in perspiration, and the tools burned his fingers.

"Serious damage," the officer concluded upon completing his inspection. "But we must work fast in order to complete repairs by dark."

They performed the necessary repairs as best they could. Then, in a low hover, they put the powerplant and controls to the test. After making one more thorough inspection of the helicopter, Major Bosykh gave permission for departure. The helicopter lifted off. How would it behave airborne? The engineer had assumed the burden of a critical decision. But his calculations proved correct. The equipment did not fail them. After returning to the airfield, they proceeded with the process of putting the aircraft back on operational status. Major Bosykh skillfully organized the work in field conditions, closely monitored his men's actions, and himself performed the most complicated procedures. It was not long before the helicopter was fully ready for further operational use.

...Nikolay Bosykh was born in the village of Iskra in Kursk Oblast. He would never forget the stories his mother had told him about his grandfather, a revolutionary and veteran of the Civil War. Nikolay was 17 years old when his father succumbed to wounds sustained in combat. His mother was left with five children to raise. His older sister was the only one working, on the kolkhoz. He enrolled in Air Force school upon graduation from secondary school.

Bosykh graduated from the Kharkov Higher Military Aviation Engineering School with honors. He was assigned to a helicopter regiment as a flight technician [crew chief]. A year later the squadron Komsomol members elected him their leader. Soon the unit's Communists accepted him into their ranks.

His comrades in arms, with whom he served in the Group of Soviet Forces in Germany, in the Far East Military District, and subsequently in Afghanistan as well, took note of his enviably hardworking nature, his endeavor to get to the solution of every problem on his own, and his ability to work with others. Additional traits included dependability and selflessness: this officer would not hesitate even in the most dangerous situation. These are important qualities for a deputy commander for aviation engineer service.

His fellow servicemen recall an incident when Bosykh, giving no thought to his own safety, ran up to a helicopter, which had plunged into a mountain gorge and was engulfed in flames, to recover the flight data recorder tapes. He had only seconds to retrieve them: the fuel tanks and ordnance would explode at any moment. But this engineer acted coolly and deliberately, because it was

necessary to determine the primary cause of the crash, and they could learn this only from the "black box" tapes. And he therefore decided on a most dangerous course of action, risking his own life.

Naturally the military airmen who are members of the limited Soviet forces in the DRA work under difficult conditions. As a rule aviation engineer service maintenance personnel operate at unequipped sites. They work in all weather, from dawn to dark, and frequently under dushman [Afghan rebel] fire. This work is bound together by threads of courage.

Major Bosykh considers a high degree of professionalism, competence, and organizing ability to be among the most important qualities of an officer, especially in a leadership position. He learned this from his first mentor, deputy commander for aviation engineer service Lt Col V. Makeyev. He had served under the latter immediately upon completing service school, and later their paths had crossed once again. He had also learned a great many useful things from his senior comrades Air Force engineers Lt Yu. Anisimov and P. Tanasenko.

The party teaches us that competence is not merely knowledge, being well informed, and enjoying respect and authority. Today it is taking on new content and new meaning. Today's leader is inconceivable as a person lacking initiative, timid in resolving problems, not endeavoring to take on a heavier burden. It is precisely these qualities which were vividly manifested in Major Bosykh's character on the soil of Afghanistan, which helped him make his contribution to carrying out the missions assigned to the helicopter crews.

Specialist personnel had recovered several helicopters, repaired and returned them to operational service under the guidance of Maj N. Bosykh. In most instances they had been forced to work in extremely difficult conditions. It is not easy to evacuate a wounded man from the battlefield. And how easy is it to recover a crippled aircraft under hostile fire? Although the airmen gained experience with time, every time orders came to go out on a recovery mission they would feel a nervous excitement which did not pass until they had begun to work.

En route to a forced-landing site, veteran maintenance personnel would, on the basis of preliminary information on the nature of damage to the helicopter, make a rough estimate of the amount of work to be performed and the procedure and sequence of actions. Wasting no time, while still airborne they would begin readying helicopter engines and other equipment for installation on the damaged craft. This would shorten the time required to repair the equipment.

This engineer had occasion both to supervise repair operations at a forced-landing site and personally to perform operations involving removal and installation of parts and assemblies under churning main rotor blades, as well as removing and installing main reduction gear units weighing half a ton with the assistance of helicopters flown by highly-skilled pilots. Once in a single night a small team of maintenance personnel, working in field conditions, accomplished a job which would require perhaps the entire technical maintenance unit workforce of an aviation unit. Was it difficult?



Of course it was. But a firm combat rule prevailed in the subunit: repair on the spot everything that can be returned to operational status on the spot!

Once, after a difficult combat engagement with the dushman, cracks appeared in the tail-rotor reduction gear mounting frame on several helicopters. They could not allow the aircraft to go out with such a serious problem, but the mission to provide air support to ground troops subunits had not been rescinded. What were they to do?

Major Bosykh recalled a story he had heard from an instructor at service school, a veteran of the Great Patriotic War. In 1943 a fair number of propellers requiring repairs had accumulated in the air regiments of the 3rd Red-Banner Fighter Brigade. Capt Tech Serv A. Degot worked out a unique process procedure under the guidance of the brigade engineer for organizational maintenance. Maintenance personnel fabricated the necessary devices according to his drawings, and with the aid of these devices aviation maintenance shop personnel were able to repair the propeller blades in field conditions.

Making use of this experience from the war, the airmen, under the supervision of Major Bosykh, decided to repair the mounting frames with their own resources. Performing the necessary calculations, the engineer proposed that they place duralumin reinforcing straps on the weakened frames.

The technical solution proposed by this officer proved successful. The task was successfully accomplished.

What the aviation engineer service maintenance personnel accomplished under the guidance of Maj N. Bosykh was a genuine combat feat. It is akin to those accomplished by airmen during the war.

His colleagues Maj V. Firsov and V. Kovrigin, Sr Lt A. Orlov, WOs A. Oboznyy, A. Tuchak, and other aviation engineer service specialist personnel also performed with determination and initiative on the soil of Afghanistan.

Major Bosykh repeatedly stood face to face with mortal danger and was called upon to act with maximum risk. Once dushman crippled a Soviet helicopter, which came down with a hard landing. The impact on landing caused cracks to form in the power train. The craft had to be recovered from the forced-landing site. Time was of the essence, and working conditions could not have been worse. The sun was directly overhead, and the ground was like a hot frying pan. Everything was hot to the touch -- body armor, steel helmet, assault rifle, and tools. And a constant atmosphere of tension -- they could receive a burst of dushman lead at any moment.

But finally the helicopter was on the truck. Major Bosykh wiped sweat from his brow and looked over the airmen who were standing at attention. "Whom shall I send to accompany the truck?" he thought to himself, and glanced downward at the switchback mountain road, which looked like an unwound ball of yarn somebody had dropped from the heights. Dushman had just been mortaring a column moving along that road. He could still see that frightful scene:

shellbust plumes surging skyward, and thick smoke rising from burning gasoline tanks. "I'll go myself," the officer decided.

Ten minutes later the helicopter-laden truck was down below in the valley. The dushman had fired several mortar rounds, but fortunately they had missed their mark. In addition, the driver had engaged in vigorous evasive maneuvering.

The respect enjoyed by Major Bosykh was being consolidated with a lofty measuring stick -- the measuring stick of combat.

The busy days of military activity flew by. It was time to return home. Nikolay was drawn homeward, to his family. He was offered a new position, however, and he was asked to stay on for an additional tour of duty. Knowledgeable specialists are always worth their weight in gold. What should he do? It was with some nervousness that he passed on the news to his wife.

"You have probably already said yes," Irina replied: she knew her husband well.

Major Bosykh left the phone communications center smiling. His family understood him, loved him, and were waiting for him.

And once again he devoted his full time and energy to military service on the embattled soil of Afghanistan.

Maj Nikolay Nikolayevich Bosykh was awarded the Order of the Red Star for courage and heroism displayed during performance of his internationalist duty as a member of the limited Soviet forces in the DRA.

...The homeland greeted Maj N. Bosykh with a cold autumn rain, a rain such as he had dreamed about during those sun-scorched days in Afghanistan.

"One cannot express the feeling one has on returning to the homeland," said Nikolay Nikolayevich. "It is only when you are far away from home that you begin more clearly to realize how magnificent our homeland is, that we must love it with total devotion and reliably defend it. I want very much for such a calm, peaceful life to become established in Afghanistan as well."

It was for this reason that Maj Nikolay Bosykh went into combat. And it is for this that his fellow servicemen -- soldier-internationalists, soldiers of the world of the 1980's -- are marching into combat.

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## FIGHTER-BOMBER SQUADRON COMMANDER DISCUSSES FLIGHT SAFETY

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 87 (signed to press 2 Dec 86) pp 26-27

[Article, published under the heading "Flight Safety: Experience, Analysis, Problems," by aviation squadron commander Military Pilot 1st Class Lt Col V. Antyufeyev: "The Sky Is Unforgiving of Mistakes"]

[Text] The men of our fighter-bomber squadron have begun the new training year with a fine attitude and an aggressive spirit. I would say that each and every airman is straining at the leash, searching for opportunities to do the best job possible. The fact is that when you set about a new task, you designate the more important goals in improving combat performance, and you definitely give thought to unutilized reserve potential, to those things which have sometimes hindered one from keeping pace with the others, and one gives thought to what must be done in order not to repeat past mistakes. In short, there is a good deal to think about.

We are presently faced with even more important and difficult tasks, for as we know, there is no upper limit to improvement of combat readiness. Successful accomplishment of the combat training plan and schedule is inconceivable without strict observance of the rules and regulations governing flight duty. Matters pertaining to organization, conduct and support of flight operations are considered paramount in our squadron. They affect all airmen without exception, the entire process of training and indoctrination of combat airmen.

I am especially concerned, as is every squadron commander, by the problem of mishap-free flight operations. While not claiming full encompassment of the problem or that my conclusions are final and not subject to debate, I would like to share some of my thoughts.

The strongest guarantee of flight safety is intensive combat training which has been organized in a methodologically correct manner. The main points to which our efforts are applied are pilot flying skill, weapons and tactical training.

In ground training activities our combat pilots, in addition to the background tactical environment of flight operations, thoroughly study aerodynamics, navigation, and equipment operation. We make extensive use of simulator

systems, brief tactical drills, and dynamic run-through of a training sortie (walking it through [air combat with models]). All this is done in strict conformity with the requirements of guideline documents which articulate rules and regulations pertaining to ensuring mishap-free flight operations. Nor do we forget about clarity in training and the use of graphic and visual aids.

This would not seem to be adding anything new, because this is also the way things have been in the past. Nevertheless.... Today greater innovativeness and effort are in evidence at each training class. Flight commanders have become stricter in grading pilot training end results. While in the past a few individuals displayed "rough edges" in flying technique and gave not entirely accurate answers in training classes, this is no longer the case.

Attitude toward advanced know-how pertaining to mishap-free flight operations has also changed in this squadron. Such know-how is always synthesized and communicated to every airman.

The dynamic method of training combat pilots "from the simple to the complex" is producing positive results. The pilots of the flight commanded by Maj V. Klimov, for example, are shooting and bombing with expert marksmanship and are displaying examples of flying skill. Many other pilots have also been doing a fine job. One always has profound respect for such individuals. Their example impels their fellow servicemen to work tirelessly to improve their own professional skills and encourages them to become infused with a feeling of responsibility for flight safety.

But let us ask ourselves the following: are all airmen successfully performing their duties? Are all pilots unswervingly observing the requirements of guideline documents pertaining to mishap-free flight operations? Unfortunately not every commander or political worker can give an affirmative reply.

I feel that respect for flight rules and regulations must be fully instilled in combat pilots from the moment they receive their commission. Our unit, for example, each year receives new service school graduates as replacement pilots. These newly-commissioned lieutenants vary in character and personality, level of professional competence, proclivities and inclinations. Each has his own individual peculiarities in flying an aircraft and in his development as a pilot and combat flier. But they have the common feature of love of flying and the pilot's calling.

How is it possible, while ensuring flight safety, to break them in as combat pilots in a prompt and timely manner? Of course all veteran pilots help the newcomers. But the flight commanders are called upon to play the principal role. It is for good reason that officers of this category are called the first mentors of flight personnel, and correctly so. They teach their men on the ground and in the air. At times, however, their oversight over their men's training is weak, and they sometimes lack efficiency, firmness, and initiative. While imposing justified requirements on them, however, one should not lose sight of something else: their possibilities are frequently limited in handling a number of matters, and there exists excessive



centralization in matters which are many times not clearly apparent "from above" and which can be accomplished much better directly at the flight level.

Practical experience indicates that flight commanders are able successfully to perform their duties only when they are several flight program maneuver sequences ahead of their men. This is the concern of the squadron commanders. But the situation is not always satisfactory. Therefore sometimes their squadron commanders must assume their functions.

In view of the significance of the human factor in the job-related activities of flight personnel, we maintain a firm course of action toward strengthening the independence and activeness of flight commanders. It consists essentially in making them fully-empowered and responsible in charge of all things pertaining to meeting the men's needs and aspirations, in utilizing available possibilities and reserve potential, and in monitoring the training process and ensuring flight safety. We proceed from the position that such steps will produce the desired results only if they are reinforced by initiative on the part of the flight commanders themselves. Maj A. Rastegayev proceeds precisely in this manner. I shall cite an example.

Lt Yu. Muntyan was assigned to his flight. He had graduated from service school with honors. Therefore conversion training over to the new aircraft at first posed no particular difficulty for Yuriy. The dual training flights went well. But when the young pilot went up solo, he "lost" the ground, and he made several mistakes on his approach and landing. The flight commander quickly determined their cause: incorrect distribution of attention on the landing approach. It is easier to treat the illness if one has made a correct diagnosis. Muntyan was pulled off solo flying. Special training sessions were scheduled, pattern work in a two-seater, and practice sessions on the cockpit simulator.... It was necessary to get the lieutenant to follow the requirements of the pilot's manual pertaining to directing one's gaze during the landing approach. Major Rastegayev affixed plasticine and placed his cap, marking where the pilot's gaze should be directed. And he achieved the desired result. Lieutenant Muntyan is now meeting the performance standards of a military pilot 2nd class. And he was one of the first of the novice pilots to reach this performance level.

In our daily work we try to focus the men's attention on the fact that in the matter of flight safety one cannot tolerate complacency or conceitedness, which impede improvement in combat skills, diminish sense of responsibility, lead to violation of flight rules and regulations, and produce other undesirable consequences. I shall cite a specific example.

In the course of a tactical air exercise our squadron was to bomb an "enemy" airfield. We would be flying in IFR conditions, at low level, penetrating "hostile" air defense, and landing at another airfield. In spite of certain difficulties, the combat pilots successfully accomplished the assigned mission. There were some disappointing mistakes made, however. Military Pilot 1st Class Sr Lt S. Kozyrev was responsible for a near mishap. Occupied with setting up for and executing his landing approach, he forgot... to extend his flaps. The fact is that this is quite an uncommon thing to happen, but some people in the outfit felt that it could happen to anybody and that a big

fuss should not be made about it, since the assigned mission had been accomplished. Such an opinion does not merit comment.

Every mistake has its cause. The above statement is particularly true of flight activities. Of course objective or subjective conditions play a certain role here. As a rule in our practical experience the former constitute an exceptional factor, while the latter are a result of people's activities.

Naturally pilots who are constantly improving their flying skills, their weapons delivery skills, and who rigorously observe the requirements of documents governing flight operations feel more confident in the air and respond intelligently and coolly in difficult situations. Such combat pilots do not experience air mishaps or near-mishap situations.

The reason for Senior Lieutenant Kozyrev's error lies in the fact that he had slackened in his independent preparation for flight operations and had overestimated his own experience and know-how. I also am in part to blame for this. During the period of preparation for the tactical air exercise, principal attention was devoted to the less-experienced pilots. We also went through with them in detail the elements involved in landing at an unfamiliar airfield. The flight commanders also focused their efforts in this direction. Less attention was devoted to the experienced pilots. "They have flown such training sorties before," was the reasoning, and faulty reasoning as it turned out. For this reason a mistake was made by a person from whom such an error was not at all expected.

A very serious discussion was held in the squadron. The primary topic of discussion was methods of preparing for flight operations and effectiveness of verifying readiness. An unequivocal conclusion was reached: all are equal as regards flight rules and regulations, and consequently equal demandingness should be placed on all. We now unwaveringly follow this rule.

Flight safety depends on the actions not only of flight personnel but also on many other specialist personnel, particularly the air traffic control team. Their training is conducted on a solid foundation, utilizing specialized classrooms and integrated simulators. Therefore the regiment's regular air traffic controllers are in fact the first assistants of the regimental deputy commander in drawing up the flight operations schedule. And since this is the case, they also concern themselves with ensuring unconditional observance of this schedule.

But this is the case only with the regular air traffic controllers. But how about the squadron commanders? I personally am in favor of us having the opportunity to perform air traffic control duties more frequently. I am convinced that many of us would have a different attitude toward the flight operations schedule and would subsequently draw up a flight operations schedule not for the regular air traffic controller but for themselves, as it were. In addition to this, other and no less important organizational matters connected with mishap-free flight operations would also reach optimal solution.

The problem of flight safety I have been discussing also contains many other factors which substantially affect our flight activities. We conduct preventive efforts in this area continuously and in a purposeful manner with all categories of aviation personnel. Measures to prevent accidents are taken on the basis of a complete determination, thorough analysis and comprehensive study with personnel of any and all situations involving mishap-threatening incidents.

We have seen time and again that it is impossible to develop a competent combat pilot if unnecessary relaxation of demands, unnecessary situation simplification, and departures from the requirements of the corresponding training manuals and regulations occur in the process of combat pilot training. It is a demand of the times to work in the new manner -- innovatively, with initiative, achieving flawless observance of the rules and regulations governing flight activities. None of us is entitled to rest on our laurels, even if we have achieved excellent results, nor are we entitled to slow the pace of forward movement along the path of improving combat proficiency.

Ensuring flight safety is a difficult task, requiring the joint efforts of commanders, political workers, party and Komsomol organizations. I believe that success will be assured if one takes up this task not in a sporadic fashion but purposefully and in strict conformity with the guideline documents regulating and governing flight operations.

\* \* \*

From the editors: This article by Lt Col V. Antyufeyev addresses important questions pertaining to flight safety. The author shares his amassed experience and endeavors to analyze from the position of the demands of the 27th CPSU Congress restructuring of work style in various areas of his activities.

The editors feel that in order to accomplish a detailed synthesis of advanced know-how, to reveal deficiencies which appreciably affect flight safety, and to determine ways to correct them, it would be a good idea to begin an exchange of opinions on this problem on the pages of this journal.

We invite our readers -- commanders, political workers, staff officers, pilots and navigators, aviation engineer service specialist personnel, and other aviation personnel -- to take part in discussing the article "The Sky Is Unforgiving of Mistakes."

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## FLIGHT-LINE TRAINING DRILLS FOR AIRCRAFT SERVICING AND MAINTENANCE PERSONNEL

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 87 (signed to press 2 Dec 86) p 28

[Article, published under the heading "Advanced Know-How Put Into Practice by Aviation Engineer Service," by Sr Lt V. Mayorov: "Technical Training Drill in the Subunit"]

[Text] During a flight operations shift a fighter-bomber sustained a main-gear tire puncture. The aircraft's turnaround departure was threatened with delay. The technical maintenance unit personnel of the flight under the command of Sr Lt O. Sabitov, however, corrected the problem much faster than the standard time specified for this maintenance procedure. The aircraft took off precisely on schedule.

This is not the only instance of Senior Lieutenant Sabitov's men performing in a skilled and knowledgeable manner. Finely-honed professional skill and a sense of duty enable these airmen to service aircraft with excellent quality and to achieve excellent results in training, performance of job-related duties, and ensuring flight safety.

Purposeful, scheduled technical training greatly helps increase the skill of maintenance personnel. Training drills on the aircraft are held in the subunit on a regular basis, for the purpose of teaching the men advanced methods of servicing aircraft and armament and developing in them solid habits and skills in performing the most labor-intensive operations within the time specified by the performance standards. Training involving practice drills directly on the flight line deepens the knowledge of maintenance personnel, helps them improve their level of technical sophistication, and strengthens their process discipline and follow-through.

Certain experience in conducting training drills on the aircraft has been amassed in the subunit. In what does this experience consist? I should like to discuss this in greater detail.

In determining the topics to be covered during forthcoming practice drills, Senior Lieutenant Sabitov specifies those topics which are the most important to work on at the given moment. Let us say, for example, that the equipment is transitioning to a given period of operation or that certain procedures are



being worked on in addition to the regular servicing routine -- this becomes a training drill topic. But the main thing considered by the flight technical maintenance unit chief in determining a practice drill topic is gaps in the specialized training of maintenance personnel.

Practical experience indicates that no matter how well trained airmen may be, there are procedures which maintenance personnel encounter on a sporadic basis. Naturally they are unable to reinforce the skills involved in performing these procedures. From here it is but a short distance to violations of work-process discipline and diminished quality of aircraft servicing. Naturally this cannot be permitted. In organizing and conducting practice drills, Lieutenant Sabitov endeavors to take into consideration all factors affecting their effectiveness.

First of all this officer concerns himself with ensuring that his men acquire profound theoretical knowledge of the topic, for without a clear idea of the substance of physical phenomena it is frequently difficult to grasp the operating principle of a given aircraft component, and therefore there will be little return on effort expended during a practical training session on the flight line. It is for this reason that every practice drill in the subunit is preceded by a theoretical training class, during which maintenance personnel analyze the design, construction, and operation of systems and components as well as the specifics of their servicing and maintenance. This is followed by demonstration of a specific maintenance procedure. The men master it phase by phase: preparation of the work area, performance of the maintenance procedure, and checking of the job performed. Senior Lieutenant Sabitov draws the men's attention to typical malfunctions and possible mistakes.

This applies first of all to the quality of aircraft servicing and maintenance. After reinforcing a specific maintenance procedure, aviation engineer service specialist personnel work on performing a procedure faster, with the goal of surpassing the time performance standard.

Training equipment designed and built by subunit personnel who are good at such things is extensively employed to increase the effectiveness of such training activities. In particular, a classroom for studying powerplants has been set up for airframe and powerplant maintenance personnel. The classroom also contains mock-ups of an aircraft's hydraulics and drag chute unit. This enables the airmen to study the equipment more thoroughly and in greater detail.

In my opinion another valuable point is the fact that a practice drill in this vanguard subunit is not held on a sporadic basis and not only at a time specially designated for this. Any opportunity is used for such training activities. In the aircraft armament maintenance group headed by Sr Lt A. Mikhaylov, for example, during a recent flight operations shift, aircraft armament maintenance group personnel were working on the sequence and procedures of inspecting and readying bomb and rocket armament when the aircraft were airborne or being readied to go out again. Practice drills are also extensively conducted during preliminary preparation.

Unfortunately not all Air Force units devote adequate attention to this important kind of technical training. Relying on experience already amassed by maintenance personnel, chiefs of flight technical maintenance units and servicing and maintenance groups sometimes conduct training drills in a lip-service manner, seeking to "run through" the least laborious procedures. During such training sessions on the flight line, demonstration is frequently replaced by verbal description, without showing advanced work-process techniques. It is understandable that the men show little interest toward such activities and, quite frankly, little benefit is derived. Some airmen at times make mistakes during aircraft servicing and maintenance and fail fully to observe the requirements of the corresponding manual and uniform maintenance regulations. This is particularly characteristic of young maintenance personnel. I shall cite an example.

A mishap-threatening situation occurred through the fault of Lt S. Tsvetkov. An aircraft's drag chute failed to deploy during its landing roll. A subsequent examination of the incident revealed that this officer had failed to release the securing rings. It was determined that not one single training session had been conducted with the young maintenance specialist on servicing and maintenance of the drag chute system. It is not surprising that he was weak in his knowledge of the sequence of work procedures.

Training involving practice drills is an important element in airmen's job training. Practical experience indicates that failure adequately to appreciate this fact leads to mistakes and serious deficiencies in the job performance of maintenance personnel and to failure to observe the demands of flight safety. On the other hand, regularly-held training drills which are conducted in a methodologically knowledgeable manner help improve the skills of aviation engineer service specialist personnel and help maintain aircraft in a continuous state of good working order and readiness to carry out combat missions.

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## SOVIET AIR-TO-AIR TACTICS IN SPANISH CIVIL WAR

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 87 (signed to press 2 Dec 86) pp 29-31

[Article, published under the heading "Tactics and Simulation," by Military Pilot 1st Class Col Yu. Kislyakov and Col (Res) V. Babich, candidate of military sciences: "Development of Air-to-Air Combat: In the Skies Over Spain"; part one of multiple-article series; first paragraph is AVIATSIYA I KOSMONAVTIKA introduction]

[Text] Following publication of materials on the history of aerial combat (AVIATSIYA I KOSMONAVTIKA, Nos 1-5, 1986), the editors received letters from readers requesting that we continue the discussion, presenting subsequent evolution of theory and practice of air-to-air combat. This is in response to our readers' request.

The combat experience of Soviet military aviation, in spite of the paucity of information received from the battle fronts, began to be synthesized back during the years of the Civil War. In 1919, for example, a manual on the combat employment of aircraft was issued, utilizing the experience of combat engagements fought at Kazan and Tsaritsyn. The chapter entitled "The Battle for Air Supremacy," which presented the content of this mission, advanced the requirement that fighter aviation units be formed and utilized in the most important sectors. The ability of pilots to conduct multiple-aircraft air-to-air combat and effectively to exert psychological influence on the adversary was considered to be the main condition for achieving success.

A study by Civil War veteran Red Military Pilot A. Kozhevnikov entitled "Taktika vozdushnogo boya na odnomestnykh istrebitelyakh" [Tactics of Aerial Combat in Single-Seat Fighters] was published in 1923. The author noted that the massing of air forces had resulted in a disposition of forces which required the devising of new tactics. A group of airborne fighters formed to engage in combat was called a stroy [formation]. The author proposed that group join-up, en-route, maneuver, and combat formations be devised, with each formation to correspond to a specific phase of a fighter combat flight. The list of formations contains familiar ones -- line abreast, echelon, vee formation, formation in trail, S or weaving S formation. The principles of shifting formation adopted at that time and the principal requirements on a formation (combat formation) are very similar to today's.

The journal VESTNIK VOZDUSHNOGO FLOTA [Air Force Herald] published in 1925 an article by Civil War hero I. Pavlov, commander of the 1st Fighter Aviation Group, titled "Fighter Aviation and Tactics of Aerial Combat." The author stated the future development prospects of formation air-to-air combat, examined the question of the role of attack and defense, and expressed the opinion that the spatial scope of combat would broaden as aircraft and weapons experienced further development but that close-in dogfight-type combat would be the main component in fighter pilot training and would require thorough mastery of all elements of air-to-air combat.

The first Field Manual of the Air Forces of the Workers' and Peasants' Red Army was adopted by order of the USSR Revolutionary Military Council in April 1929. Article 1 stated the purpose, function, and principal missions of fighter aviation: support of the operations of friendly reconnaissance aircraft and tethered balloons; countermeasures against hostile aerial reconnaissance and aerial observation; support of bomber and ground-attack aviation activities; countermeasures against bombing and ground-attack operations by hostile air forces.

Modes of fighter combat operations were formally articulated: engagement from strip alert and airborne alert status (patrolling); ambush actions from ground and air; escort of aircraft of other tasking functions; raids on the enemy for the purpose of gaining air superiority. The latter mode contained variations (methods) the very names of which depicted their purpose: "Sweeping out" -- destroying enemy fighters (patrols) in areas through which friendly bombers or ground-attack aircraft would be flying; "Raking up" -- flight along the battle line to destroy enemy aircraft and balloons above the battlefield; "Luring" -- challenging hostile fighter forces to attack in order to destroy them in air-to-air combat; "Display" -- feint to draw the enemy into an air ambush area, with subsequent surprise attack.

A specific concept and mission plan corresponded to each mode of combat operations, which had a specific directional thrust. Combat actions, however, regardless of the disposition of forces, manner and sequence of their utilization, were subordinated to a single principle -- aggressiveness.

A. Kozhevnikov's book entitled "Taktika istrebitelnoy aviatsii" [Fighter Tactics], published in 1933, discussed for the first time matters pertaining to control of fighters in aerial combat, organization of reliable communications, and devising a plan of battle (in detail up to the first attack pass), with the author recommending that the plan of battle consider three main factors: maneuverability, rate of climb, and airspeed.

A book by A. Lapchinskiy, well-known investigator of problems of aviation, came out in 1934, entitled "Vozdushnyy boy" [Air-to-Air Combat], in which the author addressed "not the pilot's memory but thinking," recommended that pilots develop quickness of wit, reaction, decision-making, and that aircraft handling be developed to a high state of familiarity and automatism, as there is no time to give thought to flying procedures during combat.



The period of synthesis of combat experience, the search for new modes of conduct of air-to-air combat corresponding to the increased capabilities of aircraft and armament, and restructuring of fighter tactics ended in the fall of 1936, when the first combat engagement between Republican and Fascist aircraft was fought in the skies over Spain.

"We were approaching our home field, flying Breguet-19 bombers, which could fly at a speed of 120 km/h, when we were attacked by a pair of Heinkels. Our aerial gunners were readying to fight off the attack. But suddenly four Nieuports appeared between us and the enemy. The fighters staunchly defended us in the aerial combat which ensued. Upon landing, we ran over to our saviors -- they were pilots Kopets and Kovalevskiy, as well as a Czech and a Serb, whose names I can no longer recall. Their aircraft had sustained so much damage it was painful to look at them."

Judging from the names of the aircraft, the incident described above could have occurred during World War I. The story was related, however, by Hero of the Soviet Union G. Prokofyev, one of the first volunteer pilots who, together with other Soviet and foreign volunteers, were carrying out their internationalist duty in Spain.

The Nieuport triplane, armed with a machinegun firing over the propeller, had a top speed of only 150-160 km/h and should have been on display in some museum. Pilots flew it and fought with it, however, and gained victories thanks to their boundless courage.

Some months later I-15 fighter aircraft as well as SB bombers arrived in Spain. Air combat took on a different character. At the first briefing, and subsequently at post-action debriefings as well, fighter group commander P. Pumpur instructed the pilots to seek out the enemy aloft and, exploiting the great maneuverability of their aircraft, to endeavor to be the first to attack, forcing combat on the adversary and imposing one's own will.

Engagement from an alert-on-ground status was the principal mode of fighter combat. By that time changes had occurred in this mode, connected with an increase in the speed of enemy bombers. The main air striking force of the insurgent forces in Spain was the trimotor Junkers-52, which had a maximum speed of 240 km/h. In order to intercept it before it reached its target, fighters had to take off not based on the fighter pilots' own observation, as had been the case during World War I, but much sooner. This required information on the air situation from forward observer posts. Obtaining or not obtaining such information determined whether or not incoming aircraft could be engaged. A late warning meant that the best they could do was to overtake the enemy as he was departing from the target, a fairly difficult task to accomplish when fighters lack a substantial speed advantage.

The first groups of I-15 fighters were assigned the mission to protect that country's capital -- Madrid. In other words they were to prevent the city from being bombed and to put up a dependable barrier against the fascists. First of all it was necessary to set up a warning system, to maintain "eyes and ears" on the front lines. Forward observation posts were set up, with landline communications to fighter fields and headquarters. The main

observation post was sited on the roof of the city's tallest building -- the Telefonica Company.

The observation post teams were taught to identify aircraft nationality by silhouette and were equipped with telephones, spyglasses, and rangefinders. The high degree of air transparency in that area enabled them to detect groups of hostile aircraft 20-30 kilometers beyond the battle line.

The signal to scramble after a warning was received by telephone would be given by firing colored flares. Panels would be laid out on the ground in the shape of a large arrow, indicating to the lead aircraft the intercept heading. Three squadrons based at the airfield would relieve one another, assuming a heightened alert status. And although the battlefront was quite close, thanks to reliable operation of the warning system which had been set up, the zone of so-called tactical surprise was reduced to zero.

Flight time by Fascist Junkers to the city's edge from the moment they were detected ran at least 8 minutes. With precision operations, fighters could intercept the enemy before he began bombing.

The main advantage of the alert-on-ground mode was economy of resources. But this mode could be successfully employed only if depth of airspace reconnaissance were increased. Protracted, stubborn efforts to gain time, ensuring that air-to-air combat would be initiated under advantageous conditions, commenced in fighter tactics.

...A group of three squadrons of I-15s, commanded by Sr Lt P. Rychagov, went on alert at dawn on 4 November 1936. Some time later a flare soared skyward. Engines were fired up. Taking off in flight-size elements, the squadron, "following the arrow," headed out to intercept the enemy. The pilots streaked toward their first aerial engagement....

Ignacio Hidalgo de Cisneros, one of Republican Spain's top military aviation officials, described the events of that memorable day as follows: "...German bombers, escorted by Italian Fiats, proceeding with unconcern, were intending to follow the customary pattern of bombing and strafing Madrid with impunity. The sirens were still wailing over the city, warning of the impending air raid, when a group of aircraft appeared in the sky, bearing Republican Air Force markings.... They screamed down at the Junkers in an almost vertical dive, and the fascists were unable to make the strike. Failing to hear the customary explosions, the people of Madrid realized that something new and unexpected had occurred. The people watched as the Republican pilots, executing aerobatic maneuvers and firing chattering machinegun bursts, defended the city against savage bombardment."

Prior to the attack Rychagov's squadron had climbed to altitude and was positioned higher than the fascist combat formation. The lead fighter, entering a steep dive from a position above the zone of effective fire of the Junkers aerial gunners, ended up below and behind them, in the enemy's blind spot, and proceeded to deliver accurate fire. The fighter-escort Fiats were unable to prevent the attack ("falcon strike") and were late in engaging.

After losing 11 aircraft in two days, the fascists realized that their tactics were deficient. Bombers subsequently would climb from 700 to 2,000 meters on approaching the line of contact. The escort fighter force also increased in numbers. In these conditions the Republican fighters were forced to reduce reaction time in order to climb to higher altitude. They did not yield the initiative, however. The improved power-to-weight ratio of the I-16 fighters which had arrived in Spain helped retain the initiative. "Competition" in aircraft performance commenced: the Italian Fiat could climb 5,000 meters in 10 minutes, while the German Heinkel required 8 minutes, and the I-16 6 minutes. Its high power-to-weight ratio enabled it to control stand-off distance in battle -- the pilot could swiftly close on the adversary and break off after attack. Superior equipment added to pilot skill made it possible to neutralize the fact of insufficient time available in climbing to get above the adversary.

A second mode of fighter operations -- patrol (airborne alert) -- was also perfected in the skies over Spain. A typical feature of this mode was fast combat engagement response time. This mode was too costly, however: aircraft wore out rapidly, and pilot manpower was becoming exhausted. Patrolling was employed most frequently at night, when ground forward observation posts were unable visually to spot enemy aircraft beyond the battle line, while the warning provided by the sound of aircraft engines would come too late. Republican fighter alert zones were set up in the airspace on the approaches to Madrid.

Here is how preparations were made for a new type of combat -- night air-to-air engagement.

The squadron's executive officer, Capt V. Suyazin, analyzed Junkers operations from forward observations posts. They would fly singly at an altitude of 1,200-1,500 meters all night long, at 10-15 minute intervals. After bombing was accomplished, the target area would be illuminated for a period of 2-3 minutes with parachute flares. The target would first be marked with an incendiary bomb, which would ignite a fire.

Five pilots with night-flying experience were selected for an interceptor element. The aircraft would take off and land with the assistance of car and truck headlights, together with several "bat" lights. In spite of the primitive illumination equipment, combat operations commenced.

The first victory in night air-to-air combat was won by Lt M. Yakushin, who shot down a fascist Junkers. The next victories went to Sr Lt A. Serov and Capt I. Yeremenko. Lt Ye. Stepanov, flying an I-15, executed the first night midair ramming. These victories gave notice that fighters, when flown skillfully, could become even at night a potent weapon in the battle against the enemy's offensive air forces.

Daylight patrol (airborne alert) was employed during periods of intensive fascist multiple-aircraft raids on Madrid. Republican fighters employed a triple-wave tactical disposition. Elements of I-16 fighters would proceed in the direction of probable hostile aircraft approach, with instructions to break up the fascist combat formation with a high-speed attack. Their efforts



would be augmented by elements of highly-maneuverable I-15s, which would engage and keep busy the fighter escort. The third wave, consisting of I-16s, would deliver the main strike on the bombers. A fourth wave would maintain an alert-on-ground status, a "hot" reserve force ready to take to the air at any moment.

On 8 July 1937 three Republican squadrons were sent up into three CAP zones above the city. Division commander F. Lopatin took up position at the main control center. Fiat-escorted Junkers soon appeared. Sr Lt I. Lakeyev's I-16 squadron was the first to close with the enemy, followed by an I-15 squadron led by I. Yeremenko. Executing the predetermined air defense plan, they hit a large group of Fiats and cut them off from the Junkers. The bombers, now stripped of fighter cover, were attacked by Sr Lt A. Minayev's I-16 squadron. Multiple-aircraft dogfights continued for more than 30 minutes. Aircraft were running low on fuel. Division commander F. Lopatin, transmitting orders by telephone, sent up his reserve -- an additional I-16 squadron, led by Sr Lt G. Pleshchenko, which provided cover for disengagement by Lakeyev's fighters. Having lost several aircraft in combat, the fascists gave up the bombing raid and beat a retreat.

After a year of intensive battles, the Franco forces received reinforcements -- the new German-built Messerschmitt Me-109 fighter. The after-action briefing following the first combat engagement determined that the Me-109 was a more sophisticated and more dangerous aircraft than the Fiat. This required that new combat tactics be devised. The Messerschmitt was unable to overtake the I-16 in level flight, and consequently it possessed no speed advantage. It required more time to execute a 360 degree banked turn than the I-15. Therefore strength was to be sought in group effort, skillful distribution of functions, and in maximum utilization of the strong points of the Soviet aircraft.

In combat the tactic of I-15 fighters drawing the adversary into a 360 degree banked turn was combined with brief high-speed attacks by I-16s. Hero of the Soviet Union G. Zakharov writes: "...We practiced 'division of responsibilities' in the sky over Madrid: the highly-maneuverable Chavkas (I-15s) engaged the enemy fighters, while the high-speed I-16s handled the bombers. These became the customary tactics of air-to-air combat."

The practice of altitude-stacking fighters of different types was followed. I-16s, flying on top, would usually attack the enemy first and push him downward, where the I-15s would be positioned. The group led by Sr Lt S. Gritsevets fought several engagements following this pattern. For example, when repulsing an attack by Junkers on a crossing site on the Ebro River, I-16s withstood a brief but fierce engagement at an altitude of about 6,000 meters. Breathing was difficult, but the pilots held fast. Losing altitude, the Messerschmitts were forced to descend, where they were hit by the lower-level element. Several additional engagements fought with a two-altitude stacked disposition ended in success. The element of tactical surprise, consisting in employment of a new disposition of forces with which the enemy was unfamiliar, was a contributing factor.



Combat against the first Messerschmitts by the I-16. in teamwork with the I-15. was fought on an equal footing. Of great importance was well-coordinated mutual support and exploitation of the adversary's slightest tactical errors. Almost insurmountable difficulties arose, however, in command and control of composite forces in the absence of radio communications. Insufficient firepower and the inadequate effective range of the aircraft's weapons were being felt with increasing acuteness.

The situation facing Republican air forces was becoming increasingly more difficult as fascist air forces received new aircraft and increased in numbers. After the fall of Bilbao on the northern front, for example, a force of 9 I-15s and 12 I-16s faced 300 enemy aircraft. As V. Andriashenko, adviser to the front's commander of aviation, wrote, the outcome of combat engagements would be determined by the self-sacrifice and expert flying on the part of our pilots. They knew that they would be fighting not one on one and not one on two, but counted on composure, precision, and mutual understanding. Sr Lt I. Yevseyev, Lt S. Kuznetsov, Capt A. Osipenko, and other combat pilots were successful in combat against Messerschmitts. In the last air battle 6 I-16s and 3 I-15s fought off an attack by 40 fascist bombers escorted by 30 fighters. But the pilots' heroism was no longer able to save the day.

Operating in extremely difficult conditions, to the limit of their physical capabilities (it was frequently necessary to fly 5-6 sorties a day), and with the enemy enjoying numerical superiority, Soviet volunteer pilots in Spain displayed examples of skill and courage, making a worthy contribution to development of air-to-air combat tactics. 35 of our pilot-internationalists were awarded the coveted title Hero of the Soviet Union. (To be continued)

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## SOLVING INTERCEPT PROBLEM WITH PROGRAMMABLE CALCULATOR

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[Article, published under the heading "The Pilot and the Computer," by Military Pilot 1st Class Lt Col A. Kaynov, candidate of military sciences: "Combat Engagement of Fighters With the Programmable Electronic Calculator"]

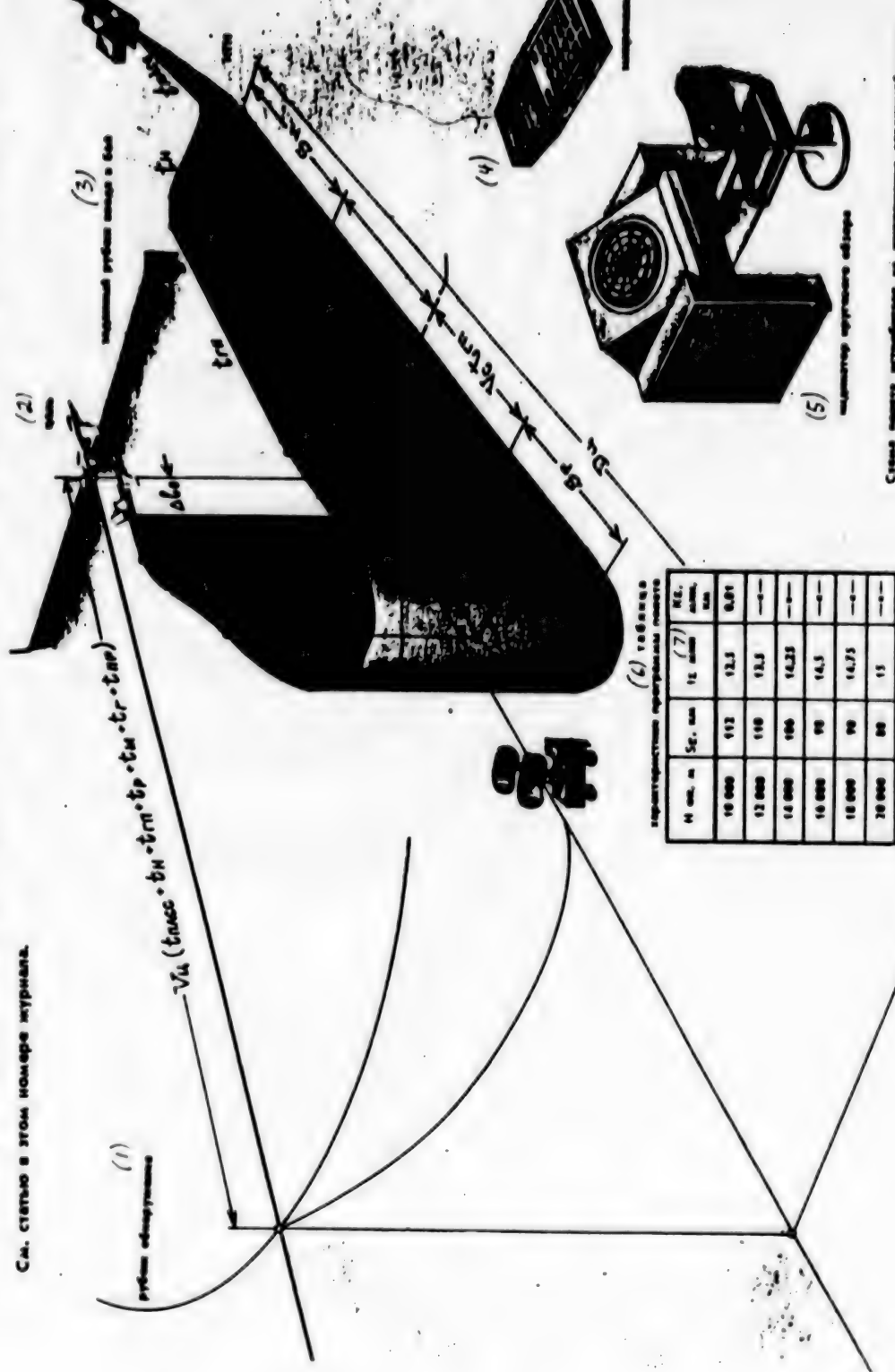
[Text] When planning fighter combat operations, a commander must assess navigation capabilities of combat engagement. This assessment consists essentially in determining and comparing the distance of available and specified points of engagement. On the basis of calculations one selects modes of combat operations, location of airborne alert or CAP zones, decides matters pertaining to redeployment to forward airfields, deployment of radar facilities supporting command and control, plus considerable additional data. The results of such an assessment make it possible to shorten the time required to formulate a plan and assign missions to subunits operating in various air environments.

In order to perform calculations of distances of available points of engagement, one must have a clear picture of the configuration of a mission to destroy an air target. Let us assume that a target has been detected at distance  $D_t$  from the scramble airfield, proceeding in the direction of the field at altitude  $H_t$  and at a speed of  $V_t$  (figure on back cover [see following figure]). Within the passage of time  $t-p$ , information on the target is transmitted to the command and control facility (PU), where a situation estimate is made on the basis of this information, a decision is made to destroy the target, and the command to scramble is given. The fighters fire up their engines, taxi to the active, take off, establish the specified formation, and proceed to the initial guidance point.

Subsequently flight to the engagement point follows an optimal program which comprises a specific sequence of changes in altitude and speed by the scrambling fighters, ensuring that the aircraft reach the designated altitude and accelerate to speed in a minimal time. In the general case, in air-to-air combat against a high-altitude target, the flight configuration employed by supersonic fighters can include the following phases (figure on back cover): climbout to acceleration initiation altitude, of duration  $t-c$  and segment length  $S_c$ ; level flight in maximum range and acceleration initiation

# ВВОД ИСТРЕБИТЕЛЕЙ В БОЙ НА ПМК

См. статью в этом номере журнала.



Система имеет устройство на расстоянии отключающей цепи

Key to to diagram on preceeding page: 1. Detection point; 2. Target; 3. Specified engagement point; 4. Electronic calculator; 5. Plan position indicator; 6. Table of flight program characteristics; 7. Minutes

altitude configuration with  $t-lf$  and  $S_{lf}$ ; acceleration to the most advantageous supersonic speed, accomplished in level flight or descending with subsequent climb, with  $t-a$  and  $S_a$ ; turn to approach the target from a specified direction (as a rule combined with acceleration in climb),  $t-m$  in duration, and displacement of point of completion of the conversion turn relative to point of initiation (along a straight line running to the target) [required displacement],  $L-d$ ; a dynamic abrupt, steep climb with loss of airspeed and altitude gain specified for attacking the target,  $t-z$  in duration and of segment length  $S_z$ ; closing on the target to specified range  $\Delta l-o$  at speed  $V_k$  in time  $t-s$ , required to correct guidance and aiming errors.

In specific instances individual segments of this program may be lacking.

#### Quantities

$$t_z = t_{acc} + t_a + t_p + t_m + t_z + t_s$$

$$S_z = S_a + S_p + S_r + S_z + S_s$$

for the rear hemisphere.

$$S_1 = S_a + S_p + S_r + V_a t_p$$

for the forward hemisphere are constant with a corresponding intercept flight configuration and are independent of target detection range if the following condition is met:

$$D_a + \Delta l_o - V_a t_z > S_z$$

In this case distance to engagement point is calculated with a formula contained in the "Spravochnik letchika i shturmana" [Pilot and Navigator's Manual]:

$$S_{pos} = \frac{D_a + \Delta l_o - V_a t_z + n S_z}{1 + n}$$

where  $n=V_t/V_s$  is the ratio of the target's speed to the speed of the fighters in level flight in maximum range configuration.

With a attack from the rear hemisphere [stern conversion],  $\Delta l-o$  is taken with a +, and with a forward-quarter intercept -- with a minus sign. If the following situation arises:

$$D_a + \Delta l_o - V_a t_z < S_z$$



there will be no level flight in maximum range configuration segment. The basic intercept flight configuration with S-Sigma and t-Sigma will become impossible, and it will be necessary to find a flight path which differs from the principal flight path with a smaller value S\*-Sigma and for which the following condition is true:

$$D_0 + \Delta l_0 - V_u t_x = S_x.$$

The interception flight configuration of interest can be obtained if the relationship between t\*-Sigma and S\*-Sigma is known. It can be expressed in an approximate fashion with linear relation

$$t_x^* = t_x - k_x (S_x - S_x^*).$$

where  $k_x = \frac{\Delta t_x}{\Delta S_x}$

is a coefficient characterizing change in t\*-Sigma and change in S\*-Sigma. With an attack from the rear hemisphere k-Sigma is taken with a +, and with a forward-hemisphere attack -- with a - sign.

Then distance to fighter engagement point, which determines the flight configuration in the absence of a level flight segment in maximum range mode, should be calculated according to the following formula:

$$S_{pnt} = S_x^* = \frac{D_0 + \Delta l_0 - V_u t_x + k_x V_u S_x}{1 + k_x V_u}$$

or, if we assume

$$n^* = k_x V_u, \text{ to}$$

$$S_{pnt} = S_x^* = \frac{D_0 + \Delta l_0 - V_u t_x + n^* S_x}{1 + n^*}$$

Input data for our calculations include airspeed  $V_t$ , distance of target detection point from airfield at the target's flight level, fighter speed in level flight segment  $V_s$ , corresponding to maximum range mode, and intercept flight configuration characteristics: t-Sigma, S-Sigma, k-Sigma, Delta-l-o. One must have tables or graphs of quantities t-Sigma, S-Sigma, k-Sigma, and Delta-l-o for different target flight levels, employed modes of attack (rear-hemisphere or forward-hemisphere), weapons, types of sights, and variations of fighter actions (for various degrees of ground-alert scramble readiness or locations in an airborne alert zone).

The procedure of calculating distances of engagement points boils down to the following: one determines quantity  $S^* = D_t + \Delta l_0 - V_t - t\text{-Sigma}$ , which is compared with quantity S-Sigma, and if condition (1) is present, the

calculation is performed with formula (2), while otherwise it is performed with formula (3).

Figure 1 contains a block diagram of the calculation algorithm.

A program corresponding to the algorithm diagram will look as follows:

```
00.ИП0 01.ИП1 02.6 03.0 04.+ 05.П7
06.ИП4 07.× 08.- 09.ИП3 10.+ 11.П8
12.ИП5 13.- 14.FX<0 15.21 16.ИП7
17.ИП6 18.× 19.БП 20.24 21.ИП1 22.ИП2
23.+ 24.П7 25.ИП5 26.× 27.ИП8 28.+
29.ИП7 30.1 31.+ 32.+ 33.С/П 34.БП
35.00.
```

#### Instructions:

1. F PRG, load program, F AVT, V/O.

2. Enter: Dt (km) to P0; Vt (km/h) to P1; Vs (km/h) to P2; Delta-l-o (km) to P3; t-Sigma (min) to P4; S-Sigma (km) to P5; k-Sigma (min/km) to P6. Operation registers: P7 and P8.

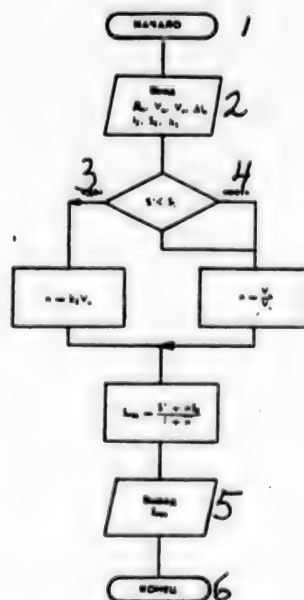


Рис. 1. Алгоритм программы.

Figure 1. Program algorithm

Key: 1. Begin; 2. Input; 3. Yes; 4. No; 5. Output; 6. End

3. S/P, result to X register.

4. For new variation, go to 2.

For example, a point situated at a distance of 100 km from the field is designated as fighter engagement point. Following detection of a high-flying air target, position fixes indicate that it is proceeding toward the airfield at a speed of 900 km/h. Its present range is 280 km. For the basic intercept flight configuration program for a pair of fighters, their aggregate distance traveled toward the target in segments with non-steady state (pertaining to speed, altitude and heading, including takeoff), is 80 km, time -- 15 minutes, speed in steady-state level flight in maximum range mode -- 1,000 km/h. With forced deviation of fighter flight path by 1 kilometer, aggregate time decreases by 0.01 min.

Let us assume, for fighters on alert-on-ground status, armed, and with a likely mode of attack, that the final target closing range is 10 km. We shall estimate possibilities of engaging a two-ship fighter element at the specified point. To accomplish this we load the program and enter input data into the electronic calculator; two minutes later we obtain a result -- 67 km. Comparing it with the specified distance to engagement point (100 km), we conclude that it makes no sense to scramble fighters from the ground -- it is too late.

Let us assume that another two-ship fighter element is presently deployed in an airborne alert zone 50 km from the specified engagement point. We shall now estimate the possibilities for this pair of fighters. Aggregate travel toward the target by the principal intercept configuration is 40 km, time -- 9 min, and present target distance from the zone is 230 km. We load the 0, 4, and 5 registers with new input data -- 230, 9, and 40 respectively -- and perform the calculation. After 0.5 minutes we obtain a result -- 74 km. The specified engagement point is 50 km from the zone. We make the decision to make the intercept with this pair of fighters and immediately issue a command to the element leader.

In more general cases, when the target is heading not for the fighter field but is proceeding on a course of gamma-t (Figure 2), distance to engagement point is calculated with the following formula:

$$S_{\text{pos}} = \frac{n\hat{S} - \sqrt{\hat{S}^2 + (1-n^2)y^2}}{n^2 - 1} \quad (4)$$

where

$$\begin{aligned} \hat{S}^2 &= D_a \cos \alpha - V_a t_x + \Delta l_0 + n S_z; \\ y &= D_a \sin \alpha; \end{aligned}$$

$$n = \frac{V_a}{V_r} \quad \text{if} \quad D_a \sin \alpha \geq S_z \quad \text{or}$$

$$\begin{aligned} n &= \frac{D_a \cos \alpha - V_a t_x + \Delta l_0}{\sqrt{S_z^2 - y^2}} \\ \text{при } D_a \sin \alpha < S_z; \quad \text{if} \quad D_a \cos \alpha - V_a t_x + \Delta l_0 < \sqrt{S_z^2 - y^2} \quad \text{when } D_a \sin \alpha < S_z; \end{aligned}$$

$$\alpha = A_a - \gamma_a - 180^\circ;$$

$A_a$  -- азимут цели.

-- target bearing.

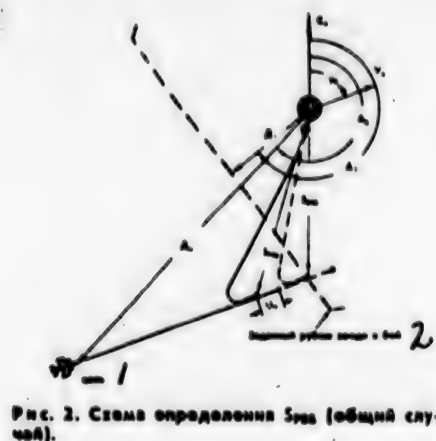


Figure 2. Diagram for determining  $S_1$  [distance to intercept point] (general case)

Key: 1. Target; 2. Specified intercept point

The distance from the fighter scramble field to the designated intercept point toward which the target will be proceeding depends on the target's heading and position at the moment it enters the detection radar field and is calculated with the following formula:

$$S_{int} = \sqrt{\left(\frac{D_s - D_s \sin \alpha \cos \beta}{\sin \beta}\right)^2 + y^2},$$

where  $D_s$  is the shortest distance from the fighter airfield to the specified point:

c

A-s is the bearing to that predetermined intercept point which is closest to the field.

A comparison of distances  $S_{ip}$  and  $S_{dip}$  gives reason to assume that engagement of fighters at the designated point is possible if value  $\Delta S_{ip} = S_{ip} - S_{dip}$  is positive and impossible if it is negative.

Figure 3 contains a diagram of an algorithm to determine fighter engagement point for the general case of target flight configuration. A programmable electronic calculator program corresponding to this algorithm diagram can be as follows:

```
00.ИП1 01.ИП3 02.- 03.1 04.8 05.0 06.-
07.† 08.Fsin 09.ИП0 10.× 11.ПД 12.↔
13.Fcos 14.ИП0 15.× 16.ИП2 17.6 18.0
19.÷ 20.ПВ 21.ИП6 22.× 23.- 24.ИП5
25.+ 26.ПС 27.↔ 28.FX<0 29.31 30./-/
31.ИП7 32.- 33.FX<0 34.50 35.↔ 36.ИП7
37.FX² 38.ИПД 39.FX² 40.- 41.F√ 42.-
```



43.  $FX < 0$  44. 50 45. ИП8 46. ИПВ 47.  $\times$   
 48. БП 49. 53 50. ИП2 51. ИП4 52.  $\div$  53. ПВ  
 54.  $\uparrow$  55. ИП7 56.  $\times$  57. ИПС 58.  $+$  59.  $\times$   
 60.  $/$  61. FBx 62.  $FX^2$  63. I 64. ИПВ  
 65.  $FX^2$  66.  $-$  67. ПС 68. ИПД 69.  $FX^2$  70.  $\times$   
 71.  $+$  72.  $F\sqrt{\quad}$  73.  $+$  74. ИПС 75.  $\div$  76. ИП9  
 77. ИП3 78. ИПА 79.  $-$  80. 9 81. 0 82.  $-$   
 83. ПВ 84. Fcos 85. ИПД 86.  $\times$  87.  $-$  88. ИПВ  
 89. Fsin 90.  $\div$  91.  $FX^2$  92. ИПД 93.  $FX^2$   
 94.  $+$  95.  $F\sqrt{\quad}$  96.  $-$  97. C/П.

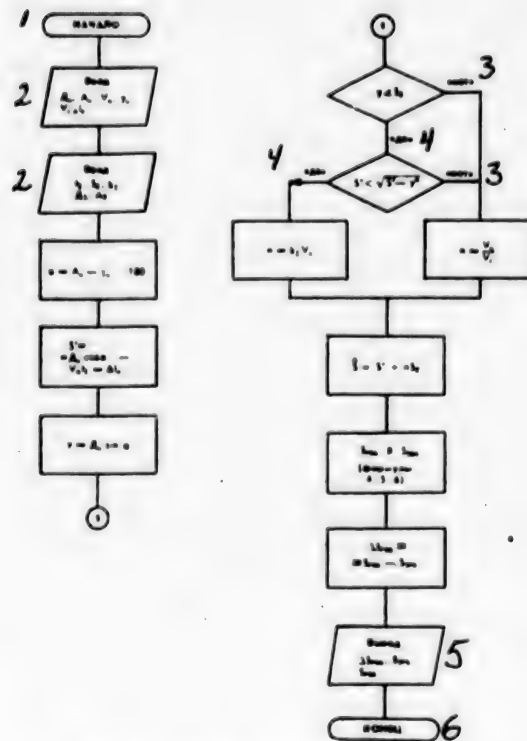


Рис. 3. Алгоритм программы.

Figure 3. Program Algorithm

Key: 1. Begin; 2. Input; 3. No; 4. Yes; 5. Output; 6. End

#### Instructions:

1. F PRG. toggle R-G to position G, load program, F AVT.

2. Enter: Dt (km) to P0; At (degrees) to P1; Vt (km/h) to P2. gamma-t (degrees) to P3; Vs (km/h) to P4; Delta-l-o (km) to P5; t-Sigma (min) to P6; S-Sigma (km) to P7; k-Sigma (min/km) to P8; Ds (km) to P9; A-s (degrees) to PA.

3. V/O, S/P, result DeltaSip to X register; if it is negative, engagement of fighters at the designated point is impossible.

Quantity Sdip is in the X1 register. To display it, press keys FBx. If it is necessary to determine the available engagement point, add the numbers contained in the X and Y registers, that is, press the + key.

4. Go to 3 for new input data.

Calculation time approximately 45 seconds.

Example: 1. Input data: Dt = 280 km. At = 260 degrees. Vt = 900 km/h, gamma-t = 100 degrees, Vs = 1,000 km/h. Delta-l-o = 10 km, t-Sigma = 15 minutes, S-Sigma = 80 km, k-Sigma = 0.01 min/km, Ds = 100 km. A-s = 270 degrees.

Result: Delta-Sip = -27.51303 km, Sdip = 127.81939 km, Sip = 100.30636.

This program, in contrast to the preceding one, is somewhat unwieldy, requires a greater quantity of input data, gives a somewhat understated result when calculating for a stern-conversion intercept and an overstated result when calculating for a forward quarter intercept. This latter is due to the fact that the assumption is made in the above formulas that no turn occurs in a forward quarter intercept and that the turn is 180 degrees is a stern-conversion intercept. Such an assumption is considered acceptable for making a fighter intercept decision.

The above material constitutes an illustration of practical application of branching programs run on programmable electronic calculators.

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## U.S. AIR FORCE ACCUSED OF BRAINWASHING PERSONNEL

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1. Jan 87 (signed to press 2 Dec 86) pp 34-36

[Article, published under the heading "Imperialism -- Enemy of Peoples," by Lt Col V. Goryainov: "U.S. Air Force Spiritual Snare"; first two paragraphs are AVIATSIYA I KOSMONAVTIKA introduction]

[Text] "If you possess mass destruction weapons, use them without hesitation anywhere in the world." "This was the most stupendous event in my life. We have been trained precisely for such things."

These two symbolic statements were made by members of different generations of U.S. military pilots, between the actions of whom lies a time span of 40 years. The first statement was made as a kind of bequest passed down by a participant in the barbaric atomic bombing of Hiroshima by the name of Tibbets. The second frank statement was made by a person, who did not wish to identify himself, in the piratical U.S. Air Force operation in Libya last April. They essentially do not differ from one another. They reflect as in a mirror the ideological attitudes and moral principles of all U.S. Air Force personnel. Boasting about crimes committed against peoples, lack of all pangs of conscience over the mass annihilation of innocent civilians, and willingness to sow death and destruction anytime and anywhere, executing the will of the ruling exploiter classes -- all these are integral traits of the moral countenance of U.S. military personnel, a result of sophisticated ideological and psychological brainwashing which is conducted in the military.

U.S. military and political leaders always have devoted and continue to devote heightened attention to Air Force personnel, especially from the standpoint of ensuring the desired level of political-moral state. This is due to the fact that the U.S. Air Force, as a most important instrument of power policy by U.S. imperialism, is always used as the spearhead of its global aggressive aspirations and is the first to be deployed to so-called "areas of vital U.S. interests" to establish order in the American image and likeness.

Therefore the political reliability of military personnel, their moral-psychological readiness and willingness to launch their death-dealing weapons immediately upon being ordered to do so, without hesitation, are viewed as the most important qualities to be developed in personnel in the process of

military service. Expressing, as it were, the credo of the U.S. pilot and the essence of his entire training system, and ideological brainwashing in particular, Major General (Grotshel), a U.S. Air Force Strategic Air Command Headquarters spokesman, stated: "We fear less that crazy people would turn up among us who would suddenly decide to drop the bomb (nuclear, of course -- V.G.) than the reverse situation, that somebody might refuse to do so when ordered."

In order to make sure this does not happen, recruits who have expressed the desire to serve in the U.S. Air Force are firmly secured in an ideological snare from their very first days in the service, are filled with misanthropic ideas, and form a mindset, needs and attitudes which are strictly in conformity with the interests of the ruling classes. The role of such a snare is performed by a system of ideological brainwashing and moral-psychological training of military personnel established back in 1948.

Its basic elements, not including an elaborate mechanism of civilian ideological establishments and the mass media as well as ideological brainwashing agencies operating at the U.S. Department of Defense, include services dealing with public relations, personnel and rear services, as well as the military chaplain service.

The Assistant Secretary of the Air Force (Manpower, Reserve Affairs and Installations) and the Director, Office of Public Affairs are directly in charge of matters pertaining to ideological brainwashing and moral-psychological training of personnel, cultural and daily living conditions as well as off-duty leisure time in the Air Force.

In contrast to other branches of the service, the U.S. Air Force has achieved a higher degree of centralized direction of ideological brainwashing of personnel. This is handled from a unified USAF Service Information and News Center, headquartered at Kelly Air Force Base, Texas. The center consists of four divisions, maintains branch offices in Chicago, Los Angeles, and New York, and essentially embraces not only military personnel but also civilians with its influence.

The internal information division, for example, publishes and disseminates printed materials, including publications of Air Force command authorities, newsletters for command personnel, news columns for air force base newspapers, and "news from home" summaries for the families of military personnel stationed abroad. This division also prepares materials for Air Force radio and television. For example, it prepares an "Air Force News of the Week" radio broadcast, rebroadcasts programs dealing with ideological brainwashing, puts out film newsreels on Air Force combat training, etc.

The civilian mass media liaison office prepares printed, radio, TV, and photographic materials on the life and activities of military personnel and furnishes these materials to the mass media in the towns in which the relatives and loved ones of Air Force personnel reside. Each month this division prepares approximately 120,000 copies of printed material and 150 radio and TV broadcast items. The Air Force command authorities use this propaganda "tool" on the one hand to provide incentive for exemplary



performance of service by military personnel and on the other hand to publicize the Air Force among the civilian population and to recruit induction-age youth.

The division of radio and television broadcasting directs the activities of the Air Force radio and TV service abroad and in Alaska. It operates three radio and TV stations, located at air bases in Ramstein (FRG), Yokota (Japan), and in Alaska.

The administrative and finance division deals with personnel, logistic and financial matters. It also directs the activities of the center's three branch offices and youth affairs components.

Planned and scheduled ideological brainwashing and moral-psychological training of personnel is carried out in the form of so-called "political education" classes. Commanders at all echelons bear responsibility for conducting such classes, and they are assisted by public affairs officers as well as chaplains. The classes are directed primarily at NCOs and other enlisted personnel. The main goal is to form in military personnel the required and desirable stereotypes of thinking and standards of civic conduct, including attitude toward government policy, as well as ensuring esprit de corps and willingness to oppose the "threat from the East."

An important role in ideological brainwashing of military personnel is played by military chaplains, whose activities are directed by the Air Force Chief of Chaplains, of general officer rank. The chaplain service contains several hundred commissioned-officer chaplains and approximately 1,000 specially-trained noncommissioned officers. Each year military chaplains conduct a large number of activities, including Sunday school and bible study classes, church services, and individual talks. The entire activities of the chaplains and their assistants boil down to giving their blessings to personnel in the name of God and the cross to perform acts on behalf of and for the benefit of the United States.

The system of ideological brainwashing and psychological training of U.S. Air Force personnel has been put to the practical test time and again. And whenever failures occurred, immediate measures would be taken to correct them. After the war in Korea, for example, in which U.S. soldiers revealed low morale and poor political attitude, a so-called "Code of Conduct" was adopted in the U.S. armed forces, and "survival schools" were established. The "Code" prescribed that every member of the military was to do everything possible on the battlefield in order not to be taken prisoner, while the "schools" allegedly gave the opportunity to experience the reality of "communist captivity." U.S. military and political leaders intended that study of the "Code of Conduct" and the "survival school" experience should develop in military personnel an immunity against captivity in forthcoming aggressive operations.

But the principle of self-preservation remained paramount in the psychology of U.S. military personnel in the war in Vietnam. Their morale and fighting spirit met the requirements of Air Force command authorities only in conditions of clear and overwhelming superiority. But as soon as a downed

U.S. pilot, for example, found himself on the ground facing even unarmed peasants, he would immediately forget the standards of the Code of Conduct and the "horrors of communist captivity" which had been demonstrated to him at "survival school" and would meekly submit to his captors.

This constituted another failure in the system of ideological brainwashing of U.S. Air Force personnel. Realistic training programs were adopted in the military in the 1970's to correct this problem. These programs called for units bearing the provocational designation "Aggressor" to be formed in the U.S. Air Force as well as in the other branches of service. Their main purpose, as is in general that of the entire realistic training program (in the Air Force it is code-named "Red Flag"), is to arouse in U.S. military personnel even greater hatred toward the enemy's military personnel and to give them practical experience in mock air-to-air combat against an "aggressor," in this manner developing confidence in victory in actual combat and reducing to the greatest degree possible the probability of being shot down, in order to avoid resorting to the commandments of the "Code of Conduct" on the ground.

The U.S. Air Force presently has four operational "Aggressor" squadrons. Two are based at Nellis AFB in Nevada, where techniques of penetrating an air defense system, taking into account the experience of the war in Vietnam, are practiced for a period of 6 weeks in the course of tactical air exercises. One squadron apiece is stationed at Clark Air Base (Philippines) and at Alconbury Air Base in England. All fly F-5E aircraft made to resemble MiGs. Flags of the Warsaw Pact member states hang in the halls and classrooms along with colorful posters displaying Soviet aircraft, and red stars adorn the pilots' lockers.

"Aggressor" squadron personnel train under the slogan: "Think and fly like Russians." The degree of seriousness with which these provocational activities are conducted is indicated by the fact that as a rule highly-skilled pilots who have logged at least 1600 hours of air time are selected for these squadrons. They receive several months of training to perform the "Aggressor" role. Each pilot specializes in some one area of Soviet Air Force tactics.

The "Aggressor" squadrons are doing their dirty business. U.S. pilots, engaging in air-to-air combat with them, receive a solid dose of anti-Sovietism and are transformed into warriors in whom are placed the hopes of execution of truly aggressive schemes and plans. It is not surprising that in recent years U.S. military authorities have been generously passing on to their NATO bloc allies the experience and know-how amassed in the course of conducting the "Red Flag" program.

Each new White House administration makes a contribution to the cause of "moral" or, more accurately, immoral training and preparation of U.S. military personnel to take part in aggressive actions in various parts of the world. Nor has this become an exception for the present military-political leadership. In fact, they have gone much further than their predecessors. As U.S. Secretary of Defense Weinberger noted in one of his annual reports to Congress, "when the Reagan Administration came into office, morale and spirit

in the armed forces were dangerously low, but the morale and political state of military personnel improved considerably after appropriate measures were taken." In his opinion this constitutes the biggest success in strengthening the combat capability of military forces.

What kind of success is he talking about? Primarily a jingoism and extreme chauvinistic patriotism which has taken hold not only among U.S. Air Force personnel but also among a substantial segment of the American people. The present U.S. leaders have done everything possible to purge from the consciousness of armed forces personnel the "Vietnam syndrome," which was engendered by the inglorious end to the U.S. war in Vietnam and which for a long time remained a stigma for every American. This was achieved with an unprecedented whipping up of nationalistic, chauvinistic, and extreme militaristic sentiments. Short but powerfully penetrating slogans, for example, are today being drummed into the heads of military personnel: "Be proud to be an American!", "America is number one!", and others.

Waves of chauvinism in the United States are channeled side by side with unchecked militaristic passions. The notion of an alleged foreordination and legitimacy of U.S. determination of the fate of countries, regions, and the world as a whole is also being widely propagandized on a foundation of a nationalistic notion of "U.S. superiority." "Today the world expects leadership from America" -- this ideological and practical guideline is being drummed into U.S. military personnel. And, following this principle, they have trampled all international standards of civilized relations between nations, have assaulted defenseless Grenada, and mounted a bandit attack on Libya. While the bloody deeds perpetrated by the U.S. military evoke anger and outrage on the part of all mankind, they delight U.S. military-political leaders. "Our armed forces," stated the U.S. President following the occupation of Grenada, "acted in the finest traditions of our country. They are all heroes." In fact, however, the "heroism" of U.S. Air Force personnel in the aggression against Grenada boiled down, for example, to leveling a hospital, burying patients under the rubble.

Nor can one fail to see another feature added in the 1980's to the content of ideological brainwashing of U.S. Air Force personnel. It involves the rebirth of Neanderthal anticommunism and anti-Sovietism, unprecedented hardening of the "image of the enemy" and his cynical dehumanization.

After Comrade M. S. Gorbachev, General Secretary of the CPSU Central Committee, and U.S. President R. Reagan met in Reykjavik, for example, a bustling campaign began in Washington to appropriate for themselves not their own proposals but rather the Soviet Union's peace initiatives. Comrade M. S. Gorbachev stressed in an address on Soviet television that not only right-wing mass media but also officials high in the U.S. Administration had adopted the tactic of outright deception.

Scandalously notorious dirty little anti-Soviet pieces are appearing constantly these days on TV and in the movie theaters. A great many publications smearing the USSR have appeared on the book counters and newsstands. Today not one single U.S. military newspaper or magazine fails to

contain libelous materials about the Soviet Armed Forces and Soviet military personnel.

These are just a few items characterizing the system of ideological and moral-psychological brainwashing of U.S. Air Force personnel, a sophisticated and constantly improving system, but nevertheless a system which is doomed to failure. In broad segments of American society, including among military personnel, there is a growing comprehension of the global danger presented by the U.S. course of militaristic policy and awareness of the fact that the vital interests of the worker masses are at variance with the interests of the ruling circles and the military-industrial complex. And the voice of reason cannot be stilled by deception, intimidation, or slander.

Describing measures carried out by the ruling classes in the imperialist nations aimed at increasing the moral-political preparedness and willingness of the soldier masses to take part in criminal wars. V. I. Lenin noted in his well-known "Antimilitarist Propaganda and the Socialist Worker Youth Leagues" that every effort is being made toward this end to "drive out of the 'brute masses' any genuine thought, any human sentiment, to instill feelings of blind obedience, senseless and savage malevolence toward 'external' and 'domestic' enemies." As is evident from the example of the U.S. Air Force, essentially these measures have not changed at all right up to the present day. A variety of lethal weaponry is to be found today in the hands of a "machine programmed to kill" (a journalist present on Grenada during the invasion characterized U.S. soldiers in precisely this manner). All this convinces us once more of the need rigorously to implement the decisions of the 27th CPSU Congress: to display a high degree of vigilance toward the aggressive aspirations of U.S. imperialism and to keep our powder dry.

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## PREVENTING LOSS OF CONTROL ON VTOL AIRCRAFT LANDING APPROACH

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1. Jan 87 (signed to press 2 Dec 86) pp 36-37

[Article, published under the heading "Practical Aerodynamics for the Pilot," by Col V. Vasenkov and Lt Col V. Tarasenko: "In Transition Mode"]

[Text] Routine flight operations were in progress. A VTOL aircraft was on final approach after completing a training mission. The pilot was attempting to dissipate airspeed while at the same time crabbing the aircraft left into the wind. He failed, however, to counter the rotational inertia by depressing the right pedal in a prompt and timely manner. The aircraft, with excessive forward speed, thrust its right wing into the airstream, banked left, and proceeded to pitch down (control surfaces were in trim). Subsequently, turning on its vertical axis in a 360 degree "waltz," the aircraft reestablished the trim-set roll and pitch attitude, and the pilot landed the aircraft safely.

What had happened? What was the reason for the aircraft's rotation? Is it possible to avoid getting into these conditions, and if one does, how should the pilot proceed in order to complete the landing without mishap? On the basis of obtained research materials, we shall endeavor to explain this phenomenon in understandable terms.

The term "perekhodnyy rezhim" [transition configuration or mode] first appeared in aviation terminology along with the VTOL aircraft. This configuration applies to VTOL aircraft flight conditions in a range of airspeeds from zero to that at which aerodynamic flight is possible.

VTOL aircraft possess a number of peculiarities absent in aircraft of traditional types. In order to ensure controllability in transition-mode conditions, they are provided with a control-jet system which, together with an automatic stabilization system (SAS), provides aircraft stabilization and attitude control.

The control-jet system has a rated power capability. Air bled off the engine compressor is used as working medium. In connection with this, an increase in control-jet output significantly degrades engine performance. For example, a 10 percent increase in air bled for control-jet use reduces engine thrust by

20 percent and increases specific fuel consumption by 25 percent. Consequently, there is a limit to control-jet output, with output selected on the basis of ensuring desired controllability characteristics in transition-mode conditions.

We should note that the most demanding (regarding thrust) VTOL operating configuration is vertical takeoff. For this an aircraft must have a thrust-to-weight ratio of greater than 1. The high required thrust-to-weight ratio means considerable rate of air flow through the engine. The air flow rate for a VTOL aircraft weighing 10-11 tons and with a thrust-to-weight ratio of  $m=1.2$  runs 200 kg/s. With such high flow rates, stagnation of air flow in the engine air intakes adds to the aerodynamic drag on the aircraft significant drag caused by input pulse, the vector of which is directed opposite to motion. It is equal to the product of air flow per second times airspeed. This is thoroughly discussed in a book by V. Taranenko titled "Dinamika samoleta s vertikalnym vzletom i posadkoy" [Dynamics of a VTOL Aircraft].

In a VTOL aircraft with air intakes positioned forward of the center of gravity, with a change in angle of attack and yaw angle there arises a destabilizing moment from input pulse as well as due to redistribution of pressure on the nose section of the fuselage. Subsequently, to simplify comprehension, when we mention moment from input pulse we shall include this to mean additional moment from redistribution of pressure on the nose section of the fuselage forward of the air intakes.

In connection with the fact that control jet output is limited, aerodynamic forces and moments at speeds close to zero are insignificant, while the moment from engine input pulse during slip can reach substantial values, there is a possibility that the aircraft can initiate autorotation. Autorotation is defined as rotational motion by an aircraft on its vertical axis at supercritical yaw angles.

We shall examine the physical picture of autorotation by a VTOL aircraft in transition mode. The forces and moments indicated in Figure 1 act on an aircraft in steady-state flight with a slip component. The aircraft begins to turn on its vertical axis due to disturbance of the condition of equilibrium of moments on the Y axis:

$$M_{y, \text{in}} = M_y^{\beta} + \dot{M}_y^{\delta_r} + M_y^{\text{CTP}} \delta_{\text{CTP}},$$

where  $M_{y, \text{in}} = m_c V_{x, \text{in}} \sin \beta$  yawing moment from engine input pulse ( $m_c$  -- rate of air flow per second):

$M_y^{\beta}$  -- moment of directional stability:

$\dot{M}_y^{\delta_r}$  -- yawing moment during rudder deflection:

$M_y^{\text{CTP}} \delta_{\text{CTP}}$  -- yawing moment from control jet.

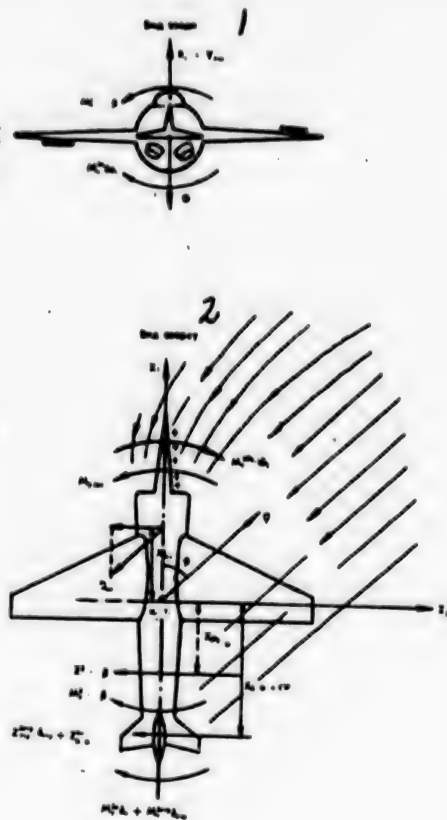


Figure 1. Diagram of forces and moments acting on VTOL aircraft during flight with slip component

Key: 1. Rear view; 2. Top view

At a yaw angle of less than beta-add (Figures 2, 3), the aerodynamic moment of directional stability increases simultaneously with increase in moment from input pulse (destabilizing moment), but to a significantly greater extent, as a result of which the aircraft recovers without the pilot intervening with the controls. At yaw angles exceeding beta-add but less than beta-cr, it continues to increase the yaw angle. But if the pilot promptly intervenes, the aircraft returns to the envelope of allowable angles.

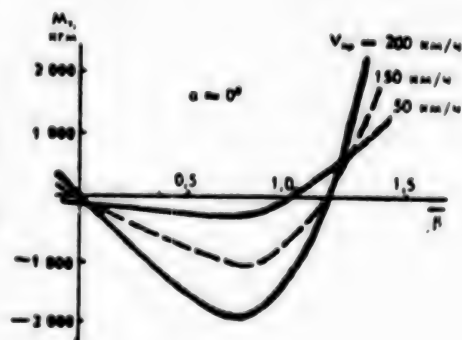


Figure 2. Relationship between a VTOL aircraft's directional stability and airspeed

Control Effectiveness Boundary

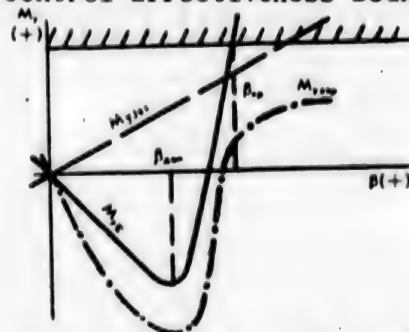


Figure 3. Yawing moments acting on an aircraft in flight configuration with a slip component

When an aircraft reaches yaw angles greater than beta-cr, directional control effectiveness

$$M_y^{\delta_a} + M_y^{\delta_{crp}}$$

is no longer sufficient to counter the directional turning moment

$$M_{y,ss} + M_y^{\beta} = -M_{y,z}$$

The aircraft continues to turn on its Y axis, and autorotation sets in.

We should note that when rotation occurs, moments of inertial forces are added, overcoming which requires certain control output expenditures.

An aircraft's behavior in autorotation depends on the airspeed at which it develops. At airspeeds close to zero (0-50 km/h), aerodynamic forces and moments are negligible. The moment generated by powerplant input pulse can be balanced only with a control-jet moment. If a VTOL aircraft lacks a heading stabilization system, it can enter a critical yaw angle either under the effect of an external disturbance or as a result of the pilot producing large rates of controlling angular motions. Autorotation in conditions of near-zero airspeeds is "flat," that is, without change in roll and pitch angles.

At airspeeds of greater than 50 km/h, aerodynamic forces and moments, which increase with increased airspeed, begin to affect a VTOL aircraft's behavior. Its behavior in these configurations differs from autorotation at near-zero airspeeds.

With a translational velocity at which the influence of moment of lateral stability  $M_{\beta-x-\beta}$  occurs, in aircraft with a swept or delta wing autorotation is accompanied by rolling due to asymmetrical flow across the left and right wings. If moment of lateral stability  $M_{\beta-x-\beta}$  is less than available control-jet moment  $M_{\delta-\epsilon-x-\delta-\epsilon}$ , the rolling moment can be corrected, and autorotation will be "flat."



If  $c$ , autorotation is accompanied by wing rolling in the direction of the receding wing. Its intensity is determined by airspeed and angle of attack. With an increase in  $\alpha$ , VTOL aircraft lateral stability moment  $M_{\beta}$  increases (Figures 4, 5). The aircraft's intrinsic directional stability is negligible in the range of airspeeds 150-200 km/h, while lateral stability is excessive, and therefore an increase in  $\beta$ -cr is accompanied by roll angle "grab." In other words, the roll angle increases sharply with position of controls unchanged.

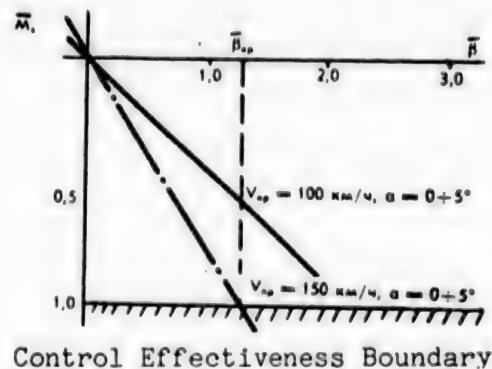


Figure 4. Relationship between lateral stability rolling moment and airspeed

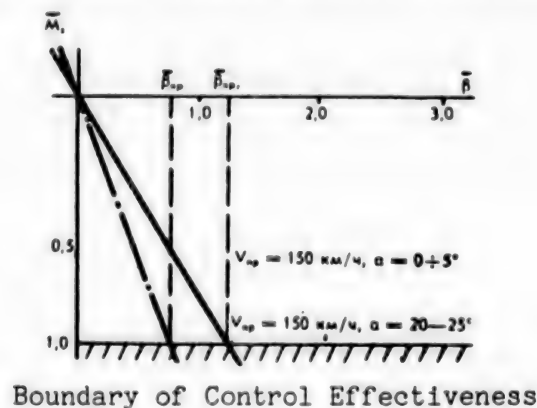


Figure 5. Relationship between lateral stability rolling moment and angle of attack

In order to prevent an aircraft from entering an "autorotation" configuration, the pilot should not allow it to exceed critical yaw angle. At near-zero airspeeds, if a VTOL aircraft lacks a heading stabilization system, the pilot must continuously keep the aircraft from turning with double pedal movement, preventing large angular shifts in heading, since even with prompt and timely pilot heading control intervention to counter inertial forces, the aircraft will continue to turn for a certain period of time, which leads to an additional increase in yaw angle. He must counter with the pedals aircraft deviations from the desired heading in the phases of vertical takeoff and landing. But to do this the pilot must constantly improve his technique of aircraft heading control with double pedal movements, without applying excessively violent pedal movements.

In the process of training pilots to execute vertical takeoff and landing, they must practice turning 30-50 degrees to the left and right of the takeoff heading while maintaining rate of angular motion constant. At airspeeds greater than 50 km/h, a pilot should not exceed the maximum yaw angle as stated in the manual when keeping the aircraft from changing heading. If the aircraft enters an autorotation configuration at near-zero airspeeds, the pilot must immediately fully depress the pedal opposite the direction of rotation and apply opposite aileron commensurate with the rolling moment. The pedals should be held in the depressed position until rotation stops, and the ailerons should be held until the aircraft comes level.

When entering autorotation configuration at airspeeds greater than 50 km/h, the pilot must vigorously apply full pedal against rotation, apply opposite aileron to the roll, and reduce angle of attack. The pedal should be held down until the aircraft stops, and the ailerons should be held until the roll rate reverses sign, in order to prevent swinging. Movement of the pedals in these configurations can be compared with actions to accomplish recovery from a normal spin by methods 2-4. Of course in the ideal situation it would be better instantly to dissipate translational velocity (in order to eliminate the moment generated by input pulse) by swinging the thrust vector to vertical and increasing pitch angle. It is inadvisable to proceed in this manner, however, since an emergency situation could develop while the thrust vector is swinging (approximately 2 seconds). An increase in pitch angle will lead to an even greater value of lateral stability moment, and therefore to a more vigorous wingdown.

In order to prevent the aircraft from entering autorotation configuration during a crosswind landing approach, at airspeeds below 200 km/h the pilot should counter aircraft drift by crabbing; countering drift with a slip should not be done at these speeds, since this increases the probability that the aircraft will exceed critical yaw angles, especially with gusting winds; at airspeeds below 50 km/h, drift can be countered with any technique, but angular rates of heading change should be small.

We should note that in flight transition configurations maneuvering with small angular rates of heading change without exceeding the maximum allowable yaw angle excludes the possibility of the aircraft entering autorotation.

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## IRATE PARENTS PROTEST OFFSPRING'S DISMISSAL FROM AIR FORCE SCHOOL

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1. Jan 87 (signed to press 2 Dec 86) pp 38-39

[Article, published under the heading "Military Educational Institution Affairs," by Maj A. Zhilin, AVIATSIYA I KOSMONAVTIKA special correspondent: "Interrupted Takeoff...."]

[Text] Hero of the Soviet Union Col Gen Avn Grigoriy Ustinovich Dolnikov, deputy commander in chief of the Air Forces for military educational institutions, reaches fairly often for the file marked "File 17." It contains the neatly bound letters of parents of young men who for various reasons were not accepted to enrollment in military aviation schools as well as from relatives of dismissed cadets and from the cadets themselves. Almost every one of these letters represents a person's fate, parent anguish over a son's future, words of repentance and pleas to reinstate would-be Air Force officers.

We must state that no letter is ignored; every case is carefully and thoroughly studied. I have read more than a hundred such letters and replies to them, replies which are concise in the military manner but exhaustive. Nevertheless they do not satisfy everyone to whom they are sent. As a rule these latter are parents who occupy a substantial position in society, who consider their offspring to be an exceptional individual who should have more breaks than others, and for whom military rules and regulations are too strict and burdensome. It is people of this category who shower the highest Air Force echelons with numerous complaints about "lack of objectivity" and "prejudice," "callousness," and "heartlessness" on the part of these lads' superiors.

I would like to begin this discussion with such letters, and not only because the people who write them frequently lack objectivity themselves, but also because they sometimes simply sweep aside the moral aspect of a given conflict and elementary human decency. These letters, like bullets in the back, deeply wound meritorious, decent, respected individuals. It was painful and quite upsetting to see a gray-haired combat veteran pilot, who selflessly defended the homeland during the years of ordeal, who received grave wounds and once again returned to flight duty so that the present generation can live in peace

and plenty, give a bitter sigh on reading the sharp, biting words so abundantly served up in such letters.

These letters are written by different people. But most of them have one thing in common: a blind love for their children, a belief that they constitute an exception, that they are entitled to get away with anything and be exempt from punishment. Those fathers and mothers who by virtue of their occupational and financial status are able to create for their sons special conditions for their schooling and their lives apparently are of the opinion that everything will be as they wish it at military service school as well, and their beloved offspring came to believe that they could easily waltz through a "prestige" higher educational institution, such as, for example, a higher military aviation school for pilots. For the sharp elbows of their influential parents would ensure their movement up the ladder of career advancement and life. Hence the notion that one should be treated differently than one's fellows and the confidence that one is exempt from punishment.

...I have here some letters written by Artur Borisovich K. (for various reasons, here and henceforth we shall not state last names), addressed to the commanding officer of the Kharkov Higher Military Aviation School for Pilots and to other highly-placed officials. This father rather harshly protests a decision made by the school authorities to dismiss their son Vadim for a "harmless prank," a "childishly ill-considered minor offense." Just what was this offense?

...On one of his first days at school, cadet Vadim K. (son of Artur Borisovich), in disregard of military regulations, proposed to classmates... that they beat up the company first sergeant for requiring that they observe the elementary rules and regulations governing life in the military. Such "ingenuousness" is subject to criminal penalty. Quite frankly, however, they gave the lad a break. Considering the fact that he had not yet taken the military oath of allegiance, he was simply shown the door.

Instead of responding in a proper manner to his son's actions, however, Artur Borisovich instantly turned the affair upside down and hastened to accuse the boy's superiors of "cruelty" and "lack of humanity," and called the manner and procedure of selecting high-school graduates... "flawed." Here is an excerpt from his letter: "A great deal is being written and spoken at the present time about abuses connected with accepting applicants to civilian higher educational institutions, and yet for some inexplicable reason we say nothing about service schools. But now I have personally encountered an ill-considered decision regarding the fate of my son.... Of course my son committed a gross violation of military discipline. He deserved to be expelled," grants Artur Borisovich, but immediately does an about-face. "if one considers that we are dealing with a boarding school for young damsels of the nobility rather than a gathering of contemporary lads from throughout the country who graduated just a month ago, who know how to smoke, drink, and swear."

It is rather surprising to hear this from a person who serves as a secondary-school principal (!) and who is, as he himself states, an excellent-rated



educator. Where are his educator's wisdom, objectivity and fairness in rendering judgment on what has happened? Apparently Artur Borisovich does not wish to address these lofty moral categories when it is a matter so close to home. The main thing now for him is to defend the "honor of the family uniform," and he is not really concerned about the way to accomplish this. Particularly since in this instance he is not giving an address to the students at his school on the topic, for example, "Being fair and honest in all things and at all times"....

The news that his son Andrey, a pilot cadet in his third year at the Armavir Higher Military Aviation School for Pilots, had been dismissed from school struck Aleksey Afanasyevich S. like a thunderclap. How could this happen!? There had been no forewarning of such an unhappy turn of events. Andrey received good grades and was a Komsomol activist. Apparently this circumstance played a decisive role in the position his father chose to take. Without going into the matter of what had actually happened, Aleksey Afanasyevich, emphasizing at the beginning of the letter that for a long time he had been a party worker and now held an administrative position (the ploy of exerting psychological pressure on commanding officers is an old one: the point is to let them know with whom they are dealing!), he writes about the "monstrous injustice" which has destroyed my son's career and has undermined his "faith in social justice from his first independent steps in life," which is intolerable at the present time, at a time of such an upsurge in political activeness on the part of everybody in our country. "Once more we urgently beseech you," the father writes, addressing Col Gen Avn G. Dolnikov, "to help us in our grief and correct the mistake made by the school council."

Just what had cadet (now former cadet) Andrey S. done? I quote from the official minutes of a meeting of the council of the Armavir Higher Military Aviation School for Pilots. "He stole money, personal and military property from fellow cadets. He kept the stolen items in a hiding place he had set up in the Lenin Room (!) and in an apartment he was renting.... He was caught in the act of stealing." The mask is stripped off, and we now see the heretofore-concealed true face of this "activist." This does not at all jibe with his positive efficiency reports, character references and letters of recommendation. What could be the reason for this discrepancy? Apparently neither his parents nor his superiors were able to see the wormhole in this young man's character, his desire for material acquisition and easy money behind an external facade of satisfactory behavior; perhaps they were too busy with their own daily affairs to notice.

Was it perhaps simply that none of them took a good hard look at this boy who was straying from the straight and narrow? Apparently this is the case. But this is only one aspect of the matter. On the other hand, Andrey's parents themselves fostered the development of negative qualities, indulging his whims and giving him far more money than a boy that age should have. For example, why should a cadet, who is being fully taken care of by the state, be sent 100 or 150 rubles a month? It is his parents' business, as they say, but did his father and mother give any thought to where this kind of money would be spent?

For all of us parents, our children are the very best, the very smartest -- in short, absolute nonpareils.... This is probably the way nature has arranged

it, placing in our hearts a sacred feeling of total parental love. But how blind this love is at times! When everything is proceeding well, we are happy for our beloved offspring, subconsciously noting that we also deserve part of the credit. It is quite logical: we want to see in our children a continuation of ourselves; we would like our children to be better than us. But when a setback, failure, a dark shadow in our children's life occurs, we are prepared to blame anybody other than ourselves for what has happened.

And yet children are a moral and ethical mirror of their parents. This means that before taking offense at the child's teacher, the parent should take a good look at himself and see what moral principles his son has inherited from him and what socially useful qualities the parent has instilled in the child. For in the final analysis we ourselves are to blame in large measure: we failed to be sufficiently alert in one thing, we failed to display firmness somewhere, and at some time we gave a bad example.... Leafing through File 17, one becomes convinced that while these young people have legally come of age and have received their high-school diploma, they have not become mature morally and have not learned to give thought to their actions. And yet the practical realities of life are inexorable: it demands payment for misdeeds. This is inevitable, since society lives by laws, which are not to be broken. Subsequently enlightenment occurs. But this happens later, after the road leading to attainment of a cherished goal has been cut off permanently.

Pvt Aleksandr F. wrote a letter requesting that he be reinstated at the Chelyabinsk Higher Military Aviation School for Navigators, from which he had been dismissed for drinking. A glass of wine ended his budding career. What could be more foolish and unfortunate? Was he not aware that this is a gross violation of military discipline? He certainly was aware! Particularly since command personnel warn their charges about this from the very first day of military service and constantly remind them. This young man failed to heed these admonitions, however. Whom should he blame now? Only himself.

And yet parental indignation knows no limits in a case of a cadet's dismissal for drinking: in their opinion it is too harsh a punishment for such a "minor" offense. They are profoundly in error! An official order issued by the Minister of Defense in this regard clearly states that a cadet dismissed from service school for consumption of alcoholic beverages may not be reinstated. Therefore in this instance any "pleas and forgiveness" are to no avail. The sacred task of defending the homeland cannot be entrusted to a drunk or violator of military discipline. This is fraught with serious consequences for our state, for too great a responsibility for defense of the homeland rests on a person's shoulders together with his officer's shoulderboards. Boys who dream of making a career in the military should be very clear on this point even before they graduate from secondary school.

Nor can we ignore the following. Many parents erroneously believe that the most important thing is to get their son into a service school. The assumption is that once there, he will be reeducated and "pulled along" to graduation. A military service school is indeed a fine school of life, a school of upbringing. At the same time it is by no means a penal institution, as some people would appear to picture it. Young men come here not by coercion but because of a sense of mission, and for this reason a certain

clarity is needed. Nobody is going to wet-nurse those who consciously oppose the rigorous rules and regulations of military service. Therefore any illusions whatsoever on this score are extremely harmful.

I believe it would be unfair to claim that complaints received by the Air Force Directorate of Military Educational Institutions are merely a consequence of lack of objectivity by parents. Sometimes deficiencies occurring at service schools give people cause to turn to higher authority. For example, the lack of any comprehensible information during the period of competitive entrance examinations on why a secondary-school graduate who has taken the examinations is not being accepted to a school. There are many possible reasons, from a low overall examination score to the conclusions reached by the career aptitude board.

Andrey K. received good grades (3-4) on all examinations for enrollment at the Kharkov Higher Military Aviation School for Pilots. He was informed, however, that he would not be accepted to admission. "Why?" this high-school graduate asked. But he failed to receive a meaningful answer. It was later ascertained that in his psychophysical qualities he was surpassed by young men who had received similar marks on the general-curriculum subjects. Naturally the board of admissions gave preference to the latter. One might ask whether it would have been so difficult for the officials in question to explain this to the young man in a clear fashion, so that he would not entertain the slightest doubt as to the objectivity of the board's decision. Perhaps this should be done even before the examinations begin.

Sometimes information reaches parents and high-school graduates in a distorted form, to put it mildly. This happens because some officers who have nothing whatsoever to do with the boards of admissions generously offer various "assumptions" and "surmises," and sometimes advise parents to write directly to Moscow, etc. We must admit that our service schools contain a goodly number of persons who are not averse to giving the impression that they are influential and omniscient. They sometimes stir up people without giving thought to the consequences.

...Entrance examinations are a time of test and trial not only for the secondary-school graduate applicants but also for school administrators, command personnel and faculty. It is a test of organization, order, coordination in procedures, and objectivity in reaching decisions. The fate of young people who have chosen for themselves a career in military aviation is decided during this period. The future of these applicants depends on everybody involved in selection, training and indoctrination of future Air Force officers.

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## COSMONAUT DESCRIBES MIR SPACE STATION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 1, Jan 87 (signed to press 2 Dec 86) pp 42-45

[Article, published under the heading "Notes of a Cosmonaut," by twice Hero of the Soviet Union Col L. Kizim. Pilot-Cosmonaut USSR: "Third Launch": part one of two-part article: first paragraph is AVIATSIYA I KOSMONAVTIKA introduction]

[Text] The Molodaya Gvardiya Publishing House is readying for publication a book entitled "S dumov o Zemle" [Thoughts About the Earth]. In this book Leonid Denisovich Kizim shares reminiscences about his space missions. We publish below excerpts from this book, prepared in article form by Col V. Gorkov.

### Destination -- Mir

What feelings does a person experience as launch day approaches? I am frequently asked this question. I can now reply: various feelings. They depend on many factors, but perhaps the most important is experience. When I was preparing for my first mission, I had the feeling of something mysterious and unknown lying ahead of me. I tried to foresee various situations, to conjecture; in short, primarily my imagination was at work. And as launch day drew closer, the more frequently I found myself constantly going through the flight in my mind. I cannot speak for others, but after the State Commission gave its approval, my mind switched over to 70 percent focus on the mission. I also experienced nervousness, but I tried to keep it inside and not to give away its presence to those around me.

The acuteness of my imagination dropped off with the second mission, but psychological stress increased. I knew that Volodya Solovyev and Oleg Atkov were well trained as specialists. We also got along well together. I was concerned by something else -- stability of the vestibular mechanism. Would they respond well to weightlessness? This is very important in space. There is good reason for the saying: the beginning is half the journey. An extended mission lay before us, with an extensive, tightly-packed work schedule. This gave rise to reflections on how best to accomplish the activities program.

And now comes the third mission. I should like to note right at the outset that the attitude toward our crew was on the whole positive and kindly. "They



have experience and psychological compatibility," many reasoned. "They did a good job on the preceding mission, and there should be no particular concern about them." This was of course pleasant to hear and perhaps was true. But those who were preparing us and we ourselves knew that this was not enough.

The positive aspects of our past activities only helped us be named among candidates for the next mission. But the new mission program differed considerably from the preceding one: it did not contain a great abundance of experiments. This time the requirement was to familiarize ourselves with and fire up the new-generation Mir space station, to perform inspection, maintenance and repair operations on Salyut 7, and to do two EVAs.

Accomplishment of these tasks depended on performance of extensive dynamic operations, in which the cosmonauts were to take direct part. The fact is that the Mir station's docking assembly, to which we were to link up, had a new Kurs electronic docking approach system, incompatible with the one on the Soyuz T-15. We were to practice an improved spacecraft control method on the way to Salyut 7, and therefore the entire responsibility for approach and docking in the final analysis rested entirely on the crew.

Studies conducted by specialists at the Cosmonaut Training Center imeni Yu. A. Gagarin indicated that even a one-month break in training activities can lead to a 50 percent decrease in operator skills. We would be executing two dockings with an interval of almost 2 months each. This forced the instructors and crew to think about the problem and to seek new solutions. Specialists reexamined the initial conditions, adjusted and reworked existing methods, and drew up quantitative criteria for evaluating operator performance.

I shall not go into the practice sessions proper, particularly since there were quite a few of them. I shall merely touch upon the style of operator activity, the subject of most frequent debate. Every operator is different, just as is every pilot. But I would not go so far as to state that there are as many styles as there are individuals. Style is a more narrow concept, a component part of a person's character and personality, and therefore it is distinctive of a specific group of individuals. As for the strong and weak points of a given style, this matter should be considered in an interlinkage with the specific situation in which the person finds himself.

For example, an individual feature of one of our best cosmonaut operators, Vladimir Dzhanibekov, is the ability to perceive a situation in its entire complexity and conditionality, an inclination to predict its development prospects, and to devise one's tactics in conformity with this. He brilliantly demonstrated his abilities during his recent mission with Viktor Savinykh.

My style is somewhat different. I analyze the current situation by the method of evaluation of its component elements, determination of the main elements, and their sequential utilization in performing the principal task. The method of sequential approximations, which makes it possible to creep up to the station, as it were, in my opinion is more efficient when applied to those conditions in which Volodya and I were operating. But recall Viktor

Fedorovich Shatalov, a teacher from Donetsk and a native of my home region, and his method of reference signals. Essentially this is the same thing.

On 13 march 1986, climbing aboard the Soyuz T-15, I lifted off the Baykonur steppe for the third time. My situation on the eve of the launch was akin to the position of the commander of a unit which has captured high ground in the course of combat. The men of the adjacent units look at him hopefully and expect subsequent offensive exploitation from him. The numerous practice sessions and sleepless nights, concerns and doubts remained behind. Ahead of us lay the faith of those people who had prepared us for the mission, as well as the hopes of the entire country. What task can be more responsible than the one we were about to carry out? A similar question probably arises in every cosmonaut's mind. But when you are entrusted with a second and a third mission, you feel the degree of responsibility much more sharply and deeply.

I have been lucky in being assigned to pioneering missions. Each mission called for settling into space homes which were new to me: Salyut 6, Salyut 7, and now Mir. No man had yet crossed its threshold. How would it receive us?

The ballisticians had precisely computed our flight path. I switched over to manual control when we had approached to a distance of about 200 meters from the space station. We were to circle Mir and approach the transfer module docking assembly. I suspended the approach at a distance of about 50 meters. In about 10 minutes we would be back in communications contact. At this point we were faced with a choice: wait or proceed with the docking without waiting for reestablishment of communications contact with mission control. Every minute meant a loss of precious fuel, and we did not know how the situation would develop later. We were very close to the station, the lighting was excellent, and I could clearly see the target crosses. I decided to proceed with the docking. The main thing was to accomplish the mission, and I would show mission control later how Mir looked in space when the occasion presented itself.

And it was beautiful. In my first TV transmission I compared the Mir station with a gray-winged gull soaring above the Earth. This comparison suggested itself quite naturally. Two enormous wings -- the solar panels, a round head -- the transfer module, and the white elongated body really gave it the appearance of a bird. The words "USSR" and "MIR" stood out prominently on the white body of the station.

The new station, just as its predecessor, consists of four bays or modules and two main docking assemblies, to which manned spacecraft and unmanned supply craft as well as specialized modules can dock. It has also preserved the exterior dimensions of the Salyuts. This is perhaps the extent of the similarity.

The transfer module has been subjected to the most substantial changes. Not only its shape but its content has changed. It is now fully entitled to be called a space mooring dock, since in addition to the principal docking assembly it carries an additional four peripheral docking assemblies, to which mechanical arms, like a harbor pilot, will transfer modules arriving at the station. As in the past, the transfer module performs the function of an

airlock for cosmonaut EVA egress. I cannot say that it has become more spacious. Based on the experience of life on board Mir, it would seem advisable to have a specialized module in which would be concentrated all the requisite equipment and tools for EVA work activities. It could be fitted with extensible platforms, similar to those used by electricians doing line repairs. As it is we cannot store here tools and individual EVA gear, a need for which we are already experiencing.

And now a few words about the main station module -- the work module. As before, it consists of two cylinders of different diameter connected by a conical linking unit. But now there are two clearly-delineated areas within the module, a work area and a living area. Their content has also changed. In particular, all equipment control processes have been automated to a maximum degree. The computer system, which contains seven electronic computers, handles many station servicing operations which formerly were performed by the crew. It also helps monitor systems status with the aid of displays, which contain all necessary data.

Interior designers have also been at work. All equipment in the work area is covered with panels, which carry various hardware for attaching documentation and tools. Central control station couch design has also been improved. The station interior and placement of equipment are such that the cosmonaut does not lose his sense of "up" and "down." For example, the "overhead" is white and the "deck" is dark green.

The work module living area has changed unrecognizably. Things are now less cramped and more comfortable. How was this accomplished? All scientific instrumentation has been removed from this area. It will be located in specialized modules. The designers also considered cosmonaut comments on placement of the bicycle ergometer, treadmill, shower, and other equipment.

Along the starboard wall of this improvised room there is a wardroom table with cabinets accommodating six persons. Behind its numerous covers lie concealed the daily meal rations for each crew member, a meal heating device with timer and buzzer, and a container with suction hoses for collecting waste items. There is a refrigerator on the port side across from the wardroom table. There is provision to wash one's hands before eating. And although the washup booth is a new addition, in my opinion it is well designed.

Individual bunkrooms are another new addition. There are two of these. They enable one to have some privacy, sit and think, listen to music, in short to relax tension when this is needed.

The service module transfer tunnel with docking assembly and the service module are not essentially different from Salyut 7.

Our mission aboard the Mir station included testing all work module equipment, testing and checking out some new design solutions, and testing additional means of radio and TV communications. Therefore during the mission we performed tuning and adjustment procedures, some preventive maintenance, and set the station up with additional equipment delivered by two cargo craft, so



that the next crew could immediately proceed with its scheduled work activities.

Our great fellow countryman K. E. Tsiolkovskiy predicted at the beginning of this century the establishment of space colonies. Two Soviet stations were orbiting the Earth simultaneously during our mission. To use an analogy from life on the Earth, it was like two houses built on a single farmstead. I believe that the time will come when such houses will begin to draw closer together, forming a village, town, and city in space.

#### New Element of an Orbital Complex

In discussing the prospects which are opening up in connection with launching of the Mir space station, we should mention its component elements -- modules. As we know, before each module takes its place at the station docking assembly, it must go through a process of "breaking in," in the course of which all basic design solutions will be tested. We now know that functional modules should be specialized. While clearly cognizant of the function of each, at the same time we are aware of something else. If each is tested separately, the testing schedule could drag out for decades. How can this time be shortened?

First of all, the most diversified functional equipment was tested on board the Salyut 6 and Salyut 7 orbital stations. Secondly, Soviet design engineers and scientists considered it advisable to design and build a special orbital craft to process equipment designed to operate on future modules.

A prototype space module, the orbital craft Kosmos 1443, was launched on 2 March 1983. It is close in size and mass to second-generation orbital stations. After an eight-day self-contained flight, during which tests were performed on the craft's base systems and adjustments made in its orbital path, Kosmos 1443 docked to the Salyut 7 station. During the flight its power supply system guaranteed reliable operation of the equipment of the entire complex. Once linked up to the station, the craft did not proceed to "mooch" off the latter but, on the contrary, when necessary was able to provide the latter with part of its own electric power.

The spacecraft's payload return unit was fitted with retrorockets and a system providing for self-contained flight after separation from the orbital module, controlled reentry and soft landing, employing a parachute system. It was capable of delivering to Earth up to half a ton of payload with results of research conducted on board the orbital complex.

Kosmos 1443 substantially increased the productivity of the Earth-orbit-Earth transportation component and almost doubled crew work space on board the orbital complex. There was also a substantial increase in the volume of work with scientific equipment performed in orbit by cosmonauts V. Lyakhov and A. Aleksandrov.

Kosmos 1686, launched on 27 September 1985, docked with the Salyut 7 station five days after performance of a series of course-correction burns. The mission schedule for this craft, as an element of the complex, called for



further testing of onboard systems, units and structural elements, and practicing of methods of controlling large-mass, large-size orbital complexes. Kosmos 1686 delivered to the station fuel, provisions, water, tanks of air, replacement modules and units for the station's service systems, equipment for conducting the Mavak experiment, film, and other supplies.

Its operational-cargo unit is perhaps the largest component. Its airtight body has a volume of 50 cubic meters. This unit contains the basic systems which provide both self-contained flight and flight as an element of the orbital complex, and also maintain normal conditions for cosmonauts to live and work. For ease of storage, off-loading and on-loading, the bulk of the supplies are in containers placed along the sides of the craft. Off-loading was facilitated by three carriages traveling on guideways running down a passage.

Just as the previous craft, Kosmos 1686 was able to keep all the equipment in the complex operating reliably. In particular, it provided Salyut 7 with improved power supply and helped us replace several parts and assemblies which had ended their service life. In addition, with the aid of equipment carried on board we performed investigations of the Earth's atmosphere and cosmic particles. For example, we observed ejections of gases, ash and other matter from active volcanoes. The dynamics of movement by these substances in the atmosphere were recorded for the first time, and their composition was investigated.

Having been subjected to such comprehensive checkout and testing procedures, the new craft confirmed that it can be incorporated as an active module in the space working and living complex. Thus the Soviet space program is quite close to developing specialized modules, each of which will become a scientific laboratory or industrial installation. It could be a laboratory beyond the Earth's atmosphere, a biological greenhouse garden, a smelting shop, or a photo lab. (To be concluded)

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